

作成承認印

配布許可印



D40

VBA15001 Black

VBA15101 Silver

REPAIR MANUAL

Nikon | **NIKON CORPORATION**
Tokyo, Japan

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Specifications

Type	Single-lens reflex digital camera with interchangeable lenses		
Effective pixels	6.1 million		
CCD	23.7×15.6mm; total pixels: 6.24 million		
Image size (pixels)	• 3,008×2,000 (Large)	• 2,256×1,496 (Medium)	• 1,504×1,000 (Small)
Lens mount	Nikon F mount with AF coupling and AF contacts		
Compatible lenses*			
Type G or D AF Nikkor			
AF-S, AF-I	All functions supported		
Other Type G or D Nikkor	All functions supported except autofocus		
Micro Nikkor 85 mm f/2.8D	Can only be used in mode M; all other functions supported except autofocus		
Other AF Nikkor†/AI-P Nikkor	All functions supported except autofocus and 3D color matrix metering II		
Non-CPU	Can be used in mode M, but exposure meter does not function; electronic range finder can be used if maximum aperture is f/5.6 or faster.		
*IX Nikkor lenses can not be used		†Excluding lenses for F3AF	
Picture angle	Equivalent in 35-mm format is approximately 1.5 times lens focal length.		
Viewfinder	Fixed eye-level penta-Dach mirror type		
Diopter	−1.7 – +0.5 m ^{−1}		
Eyepoint	18mm (−1.0 m ^{−1})		
Focusing screen	Type B BriteView clear matte screen Mark V with superimposed focus brackets		
Frame coverage	Approximately 95% of lens (vertical and horizontal)		
Magnification	Approximately 0.8× (50-mm lens at infinity; −1.0 m ^{−1})		
Reflex mirror	Quick return		
Lens aperture	Electronically controlled with instant return		
Self-timer	Electronically controlled timer with 2, 5, 10 or 20s duration		
Focus-area selection	Focus area can be selected from 3 focus areas		
Lens servo	<ul style="list-style-type: none">Autofocus (AF): Instant single-servo AF (AF-S); continuous-servo AF (AF-C); auto AF-S/AF-C selection (AF-A); predictive focus tracking activated automatically according to subject statusManual focus (M)		
Storage			
Media	SD (Secure Digital) memory cards; camera supports SDHC		
File system	Compliant with Design Rule for Camera File System (DCF) 2.0 and Digital Print Order Format (DPOF)		
Compression	<ul style="list-style-type: none">NEF (RAW): compressed 12-bitJPEG: JPEG baseline-complaint		
Autofocus	TTL phase detection by Nikon Multi-CAM 530 autofocus sensor module with AF-assist illuminator (range approximately 0.5–3.0m/1 ft. 8in.–9ft. 10in.)		
Detection range	−1.0 – +19EV (ISO 100 at 20°C/68°F)		
AF-area mode	Single-area AF, dynamic-area AF, dynamic-area AF with closest subject priority		
Focus lock	Focus can be locked by pressing the shutter-release button halfway (single-servo AF) or by pressing the AE-L/AF-L button		
ISO sensitivity (Recommended Exposure Index)	200 – 1600 in steps of 1 EV with additional setting one step over 1600		

Exposure	
Metering	Three-mode through-the-lens (TTL) exposure metering
Matrix	3D color matrix metering II (type G and D lenses); color matrix metering II (other CPU lenses); metering performed by 420-segment RGB sensor
Center-weighted	Weight of 75% given to 8-mm circle in center of frame
Spot	Meters 3.5-mm circle (about 2.5% of frame) centered on active focus area
Range (ISO 100 equivalent, f/1.4 lens, 20°C/68°F)	0–20 EV (3D color matrix or center-weighted metering) 2–20 EV (spot metering)
Exposure meter coupling	CPU coupling
Digital Vari-Program/ exposure modes	Digital Vari-Program (AUTO auto, auto/no flash, portrait, landscape, child, sports, close-up, night portrait); programmed auto (P) with flexible program; shutter-priority auto (S); aperture-priority auto (A); manual (M)
Exposure compensation	–5 – +5 EV in increments of 1/3 EV
Exposure lock	Exposure locked at detected value with AE-L/AF-L button
Shutter	
Speed	30 – 1/4,000 s in steps of 1/3 EV, bulb
White balance	Auto (TTL white balance with 420-segment RGB sensor); six manual modes with fine tuning and preset white balance
Built-in flash	<ul style="list-style-type: none"> : Auto flash with auto pop-up P, S, A, M: Manual pop-up with button release
Guide number (m/ft)	<ul style="list-style-type: none"> Approximately 17/55 at ISO 200 and 20°C/68°F (manual 18/59) Approximately 12/39 at ISO 100 and 20°C/68°F (manual 13/42)
Flash	
Sync contact	X-contact only; flash synchronization at shutter speeds of up to 1/500 s
Flash control	
TTL	TTL flash control by 420-segment RGB sensor. i-TTL balanced fill-flash for digital SLR and standard i-TTL fill-flash for digital SLR available when CPU lens is used with built-in flash, SB-400, SB-800, and SB-600
Auto aperture	Available with SB-800 and CPU lens
Non-TTL auto	Available with such Speedlights as SB-800, 80DX, 28DX, 28, 27, and 22s
Range-priority manual	Available with SB-800
Flash mode	<ul style="list-style-type: none"> : Auto, auto with red-eye reduction; fill-flash and red-eye reduction available with optional Speedlight : Auto, auto slow sync, auto slow sync with red-eye reduction; slow sync and slow sync with red-eye reduction available with optional Speedlight : Fill-flash and red-eye reduction available with optional Speedlight P, A: Fill flash, rear-curtain with slow sync, slow sync, slow sync with red-eye reduction, red-eye reduction S, M: Fill flash, rear-curtain sync, red-eye reduction
Flash-ready indicator	Lights when built-in flash or SB-series Speedlight such as 400, 800, or 600 is fully charged; blinks for about 3 s after flash is fired at full output
Accessory shoe	Standard ISO hot-shoe contact with sync, signal, and ground contacts and safety lock
Nikon Creative Lighting System	Supported with built-in flash, SB-400, SB-800, and SB-600; Advanced Wireless Lighting supported with SB-800 or SU-800 as Commander.
Monitor	2.5 in., 230,000-dot, low-temperature polysilicon TFT LCD with brightness adjustment
Video output	Can be selected from NTSC and PAL
External interface	USB 2.0 Hi-speed
Tripod socket	1/4 in. (ISO 1222)
Firmware upgrades	Firmware can be upgraded by user



Supported languages	Chinese (Simplified and Traditional), Dutch, English, Finnish, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Swedish
Power source	<ul style="list-style-type: none"> • One rechargeable Nikon EN-EL9 Li-ion battery; charging voltage (MH-23 quick charger): 7.4V DC • EH-5 AC adapter (available separately; requires optional EP-5 AC adapter connector)
Dimensions (W×D×H)	Approximately 126×64×94mm (5.0×2.5×3.7in.)
Approximate weight	475 g (1 lb. 1 oz.) without battery, memory card, or body cap
Operating environment	
Temperature	0–+40°C (+32–104°F)
Humidity	Less than 85% (no condensation)

Unless otherwise stated, all figures are for a camera with a fully-charged battery operating at an ambient temperature of 20°C (68°F).

EN-EL9 Rechargeable Li-ion Battery

Type	Rechargeable lithium-ion battery
Rated capacity	7.4V/1000mAh
Dimensions (W×D×H)	Approximately 36×56×14mm (1.4×2.2×0.6in.)
Approximate weight	51 g (1.8oz.), excluding power cable

Points to notice for Disassembly / Assembly

 WARNING	
	<p>Due to an internal high voltage area, take extra care not to get an electric shock when detaching covers.</p> <p>After removing covers, be sure to discharge the main condenser according to the instructions of repair manuals.</p>

Note:

- ① When disassembling/(re)assembling, be sure to use the conductive mat (J5033) and wrist strap (J5033-5) for static protection of electrical parts.
- ② Before disassembling, be sure to remove batteries or AC power wires.
- ③ When disassembling, make sure to memorize the processing state of wires and FPC, screws to be fixed and their types, etc.
- ④ Because the low pass filter of the imaging CCD PCB is easily damaged, handle it with enough care.
- ⑤ NK is indicated in this manual when NK screw is used. Usually the same "NK" screw can be used

△ (Addition)

approx. up to three times.

(NK screw = Loose-proofing screw to which the adhesive is already applied and firmly fixed when screwed in.)

Points to notice for Lead-free solder products
<ul style="list-style-type: none"> ▪ Lead-free solder is used for this product. ▪ For soldering work, the special solder and soldering iron are required. ▪ Do NOT mix up lead-free solder with traditional solder. ▪ Use the special soldering iron respectively for lead-free solder and lead solder. <p>They cannot be used in common.</p>

Caution:

Whenever "Separation of Front and rear bodies", "Disassembly of CCD/FPC unit", or "Disassembly of Bayonet" are performed, be sure to perform "RESET AF-DEFOCUS COMPENSATION" of camera adjustment software after reassembling.

Disassembly

1. Separation of Front and Rear Bodies

Bottom Cover

- Take out the four screws (#5735) and five screws (#5674).
- Open the power-wire lid.
- Remove the bottom cover.



Rear cover

- Take out the four screws (#5690) and two screws (#5618).
- Remove the rear cover.

Note: Remove the rear cover slowly so as not to cut rear FPC of the upper portion of the cover.

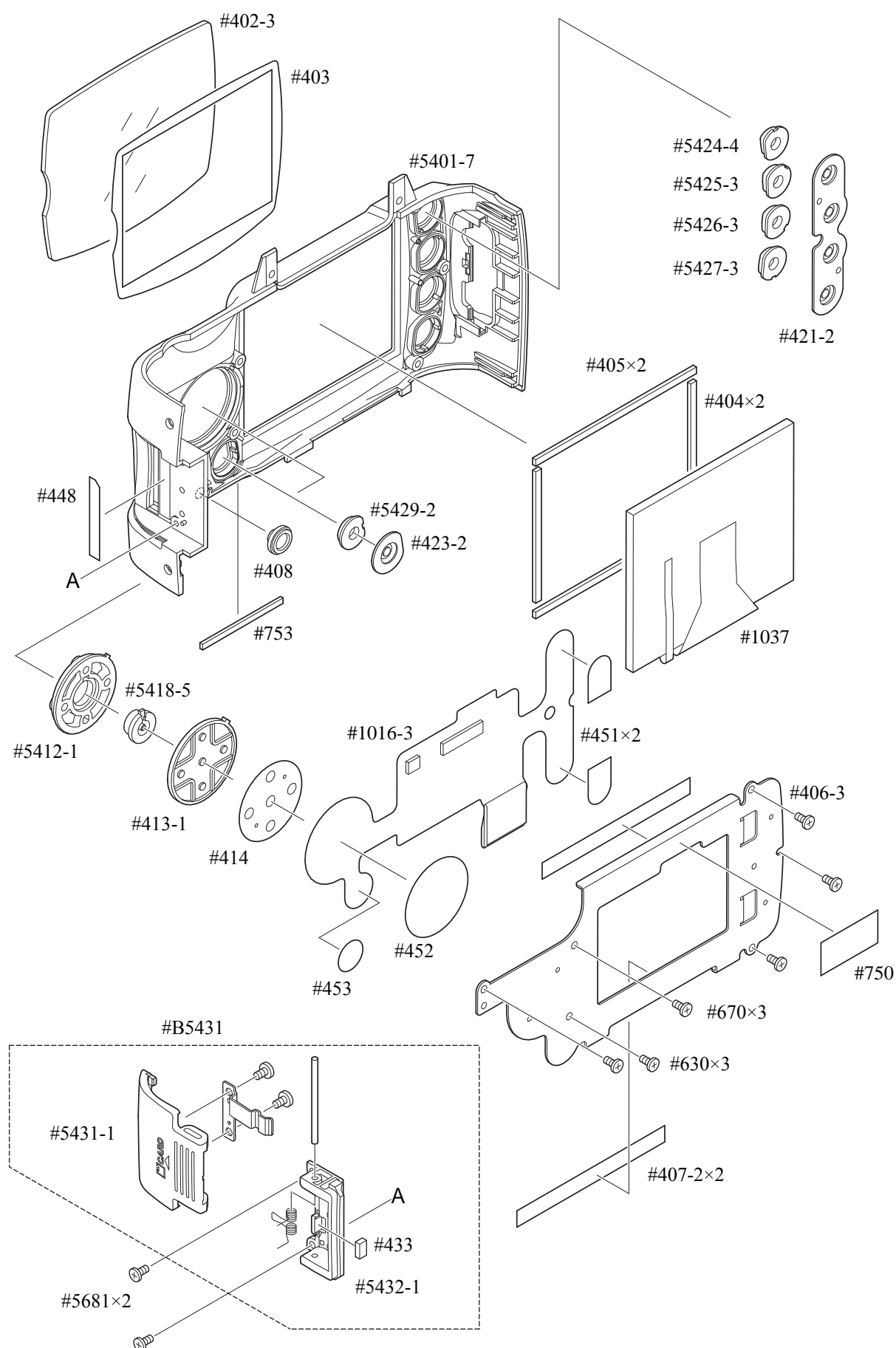
- Remove the rear FPC from the connector.



△ (Addition) NK
#5690×4

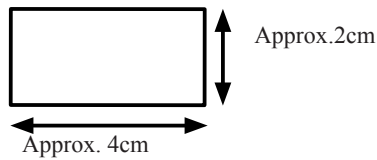


Rear cover



SB pop-up

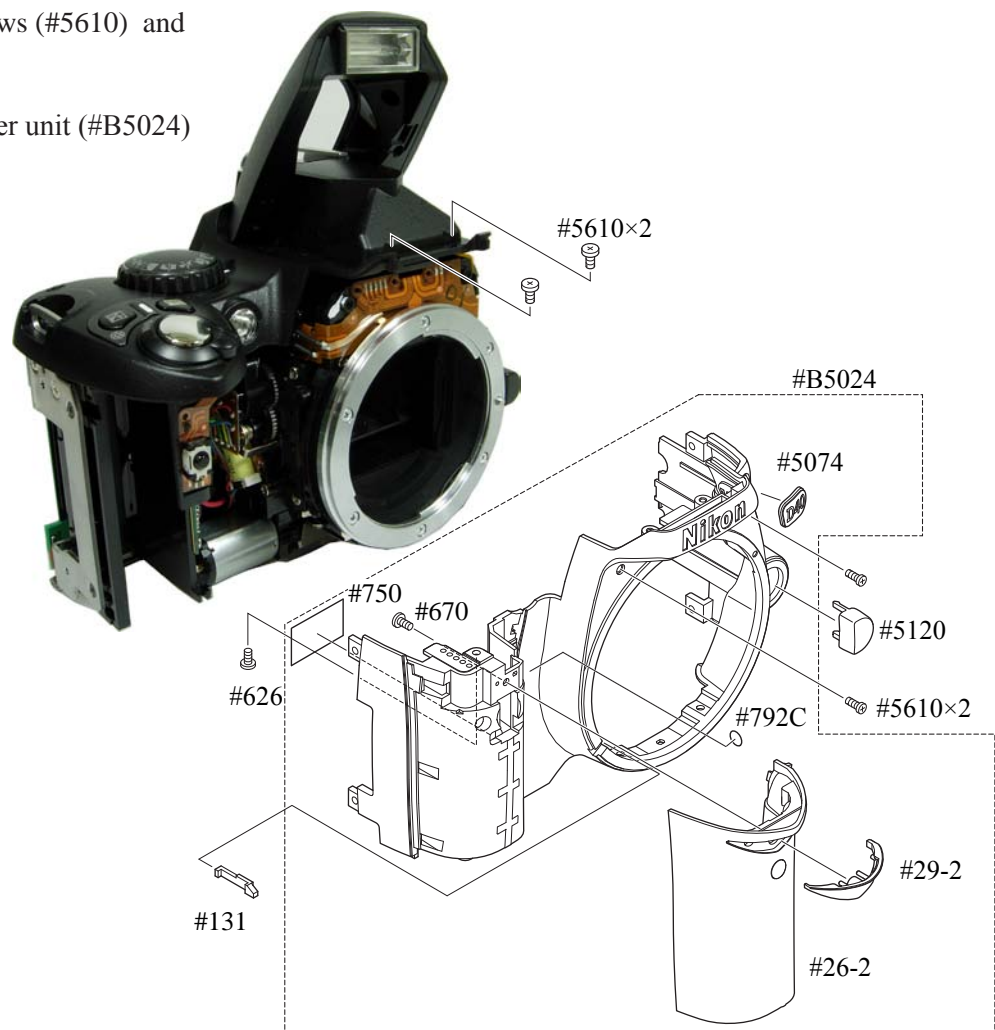
- Cut the tracing film sheet, etc into the below size of piece.
Then insert it into the clearance of the top cover pop-up part as shown right, and raise the SB by sliding the sheet in the direction of the arrow.



⚠ WARNING	
	<ul style="list-style-type: none"> • Due to an internal high voltage area, take extra care not to get an electric shock when detaching covers. • After removing the covers, be sure to discharge the main condenser according to the instructions of repair manuals.

Covers

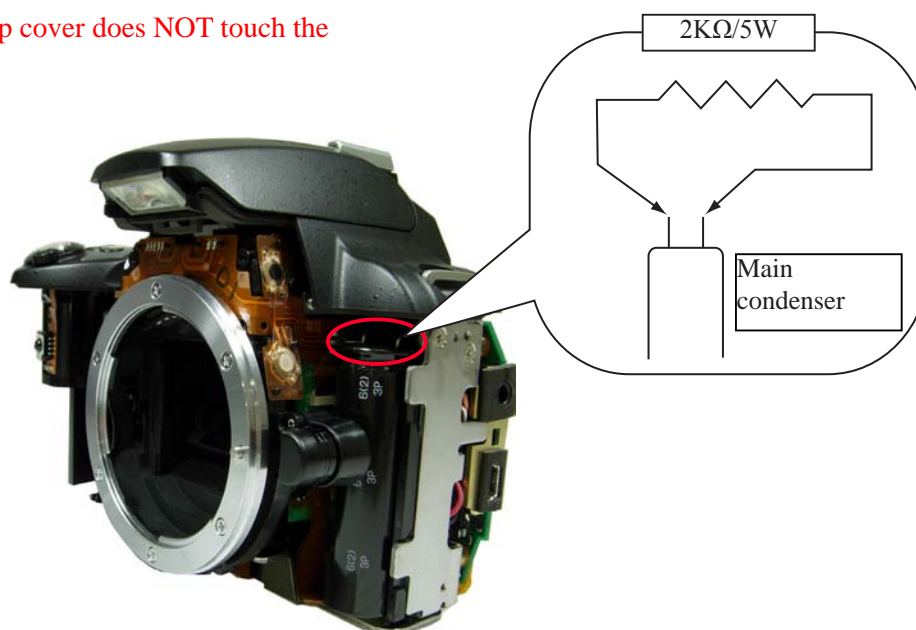
- Take out the four screws (#5610) and the screw (#626).
- Remove the front cover unit (#B5024) and [#131].



Discharge of Main condenser

- Discharge the main condenser from its both ends.

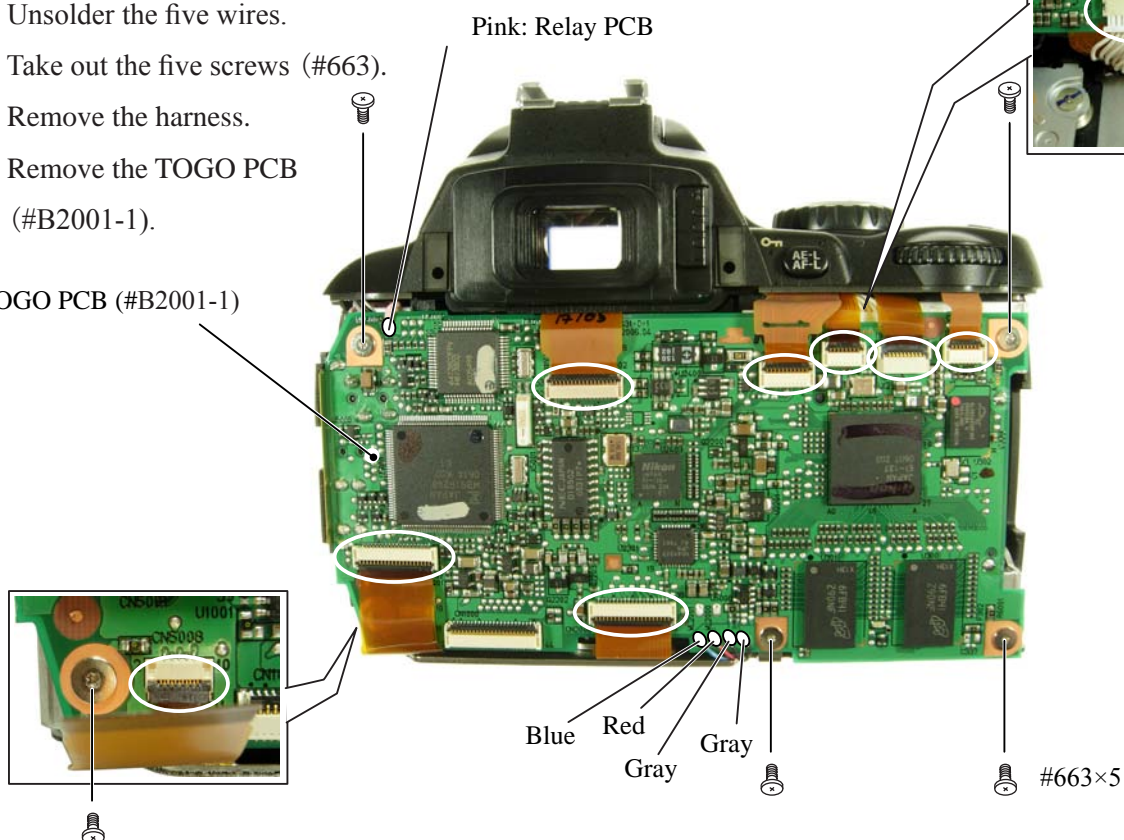
Be careful so that the top cover does NOT touch the discharge tool.



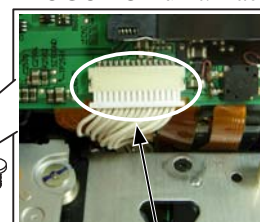
TOGO PCB unit

- Disconnect the eight FPCs from the connector.
- Unsolder the five wires.
- Take out the five screws (#663).
- Remove the harness.
- Remove the TOGO PCB (#B2001-1).

TOGO PCB (#B2001-1)



TOGO PCB unit: Back



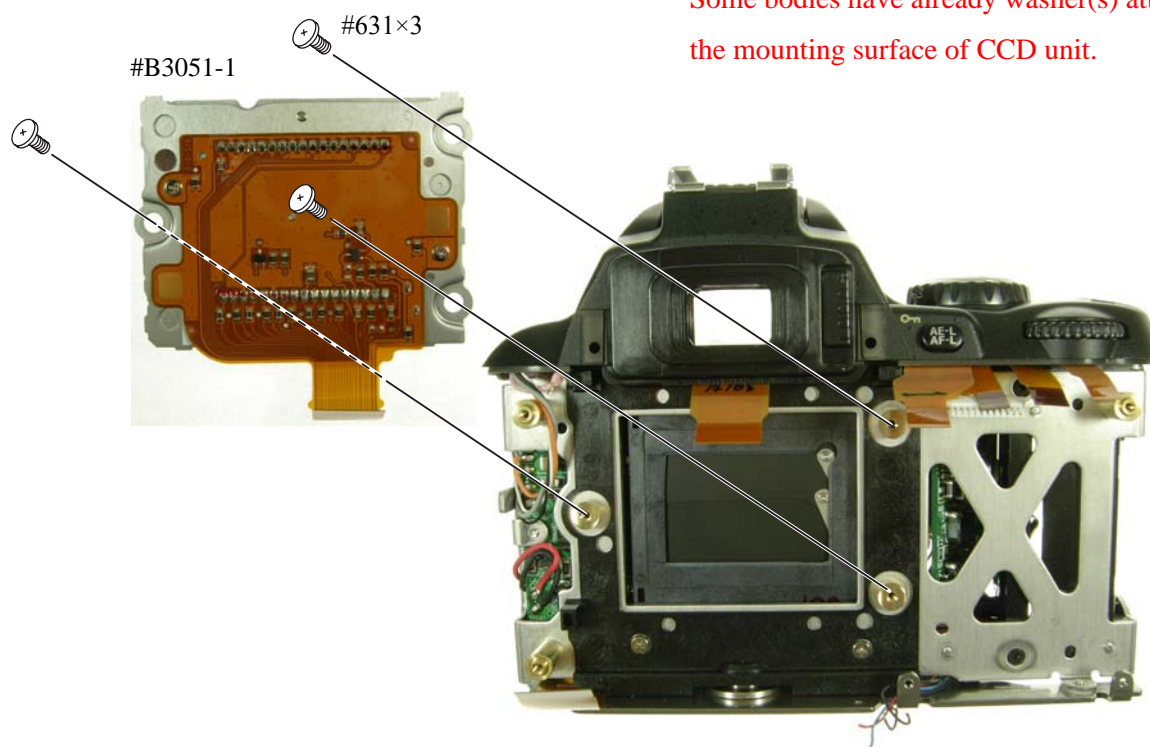
Harness

CCD unit

- Take out the three screws (#631), and remove the CCD unit (#B3051-1).

Caution:

Some bodies have already washer(s) attached on the mounting surface of CCD unit.



SB PCB

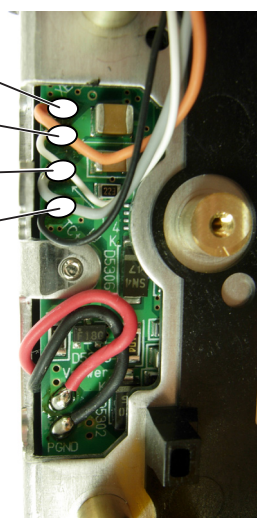
- Unsolder the four wires (connected from Top cover).

Orange: Top cover

White: Top cover

Gray: Top cover

Black: Top cover



DC/DC PCB unit

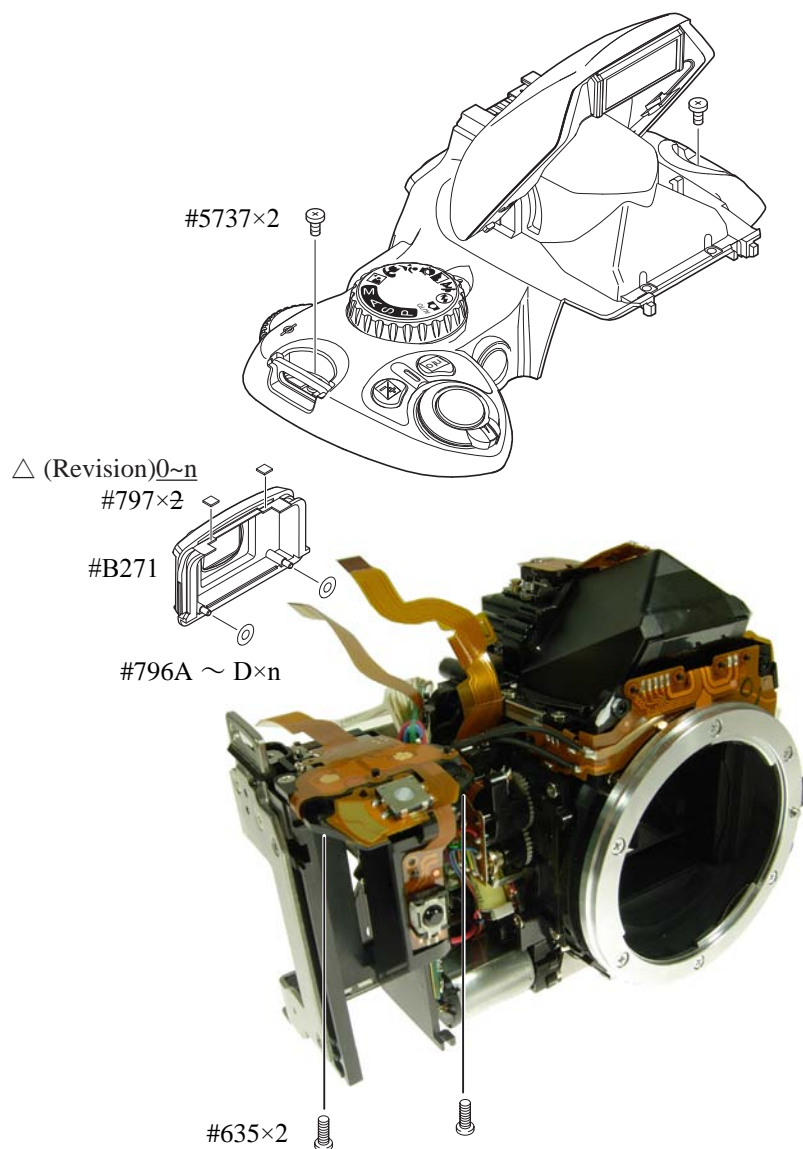
- Unsolder the wire (connected from Top cover).

Black: Top cover



Top cover

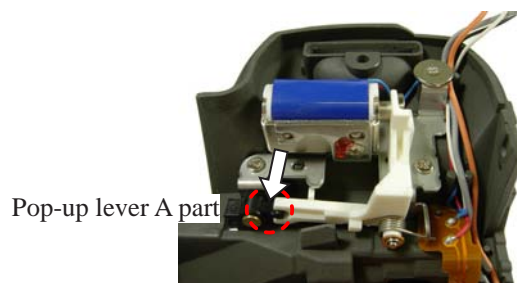
- Take out the two screws (#5737).
- Take out the two screws (#635).
- The top cover and rubber eyecap (#B271) come off.



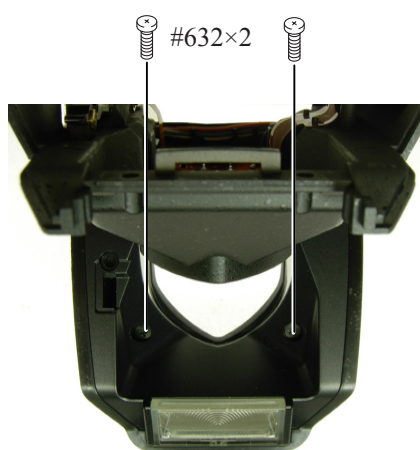
Disassembly of Top cover

SB upper case

- Press "Pop-up lever A part" of the top cover unit so that the built-in SB is raised.

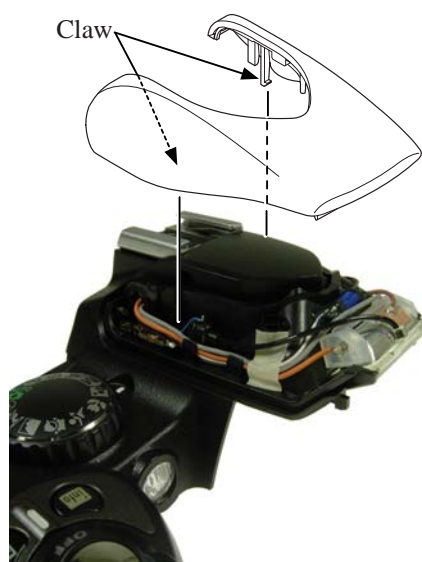


- Take out two screws (#632).



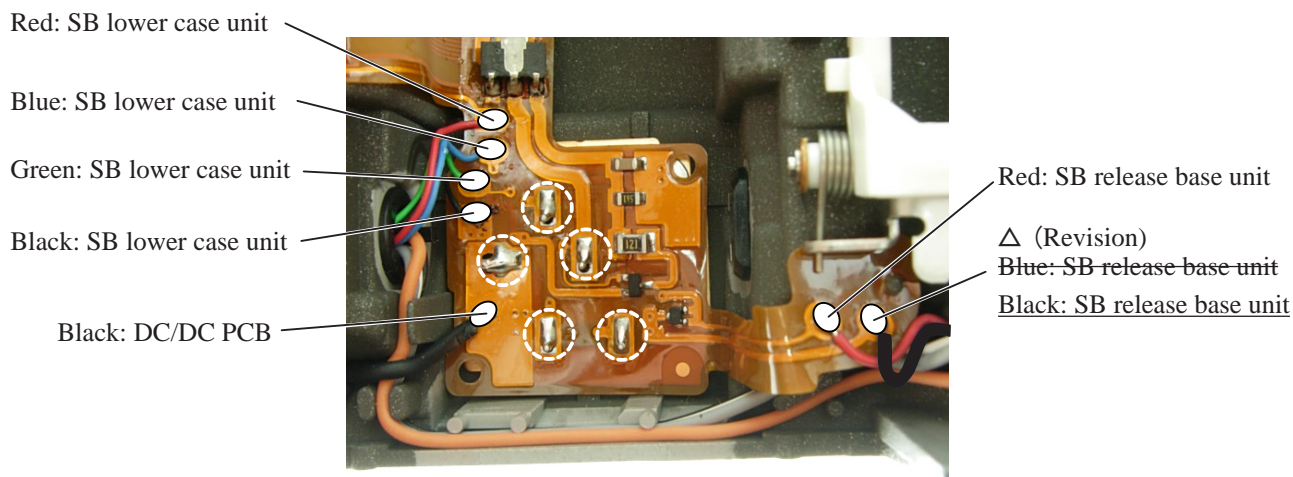
- Release the two claws. House the built-in SB and remove the SB upper case (#5301).

SB upper case (#5301)



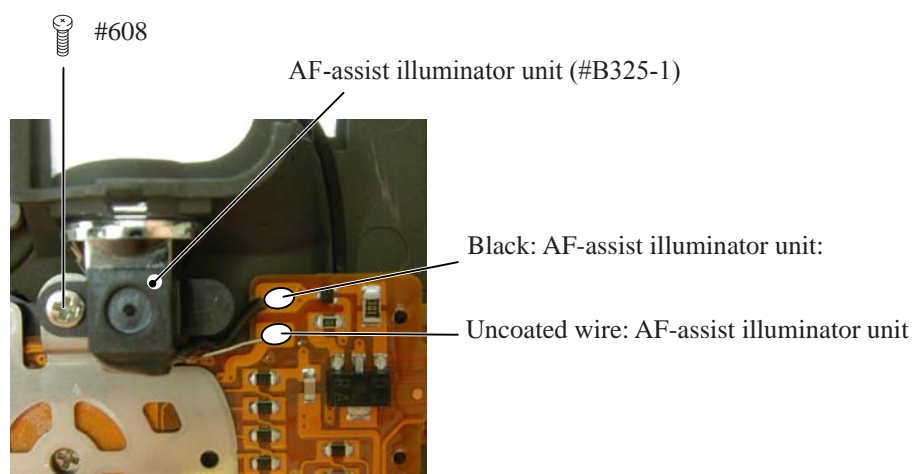
Top cover FPC / Wiring

- Unsolder the seven wires (connected from SB lower case unit and SB release base unit).
- Remove the five solder bridges.



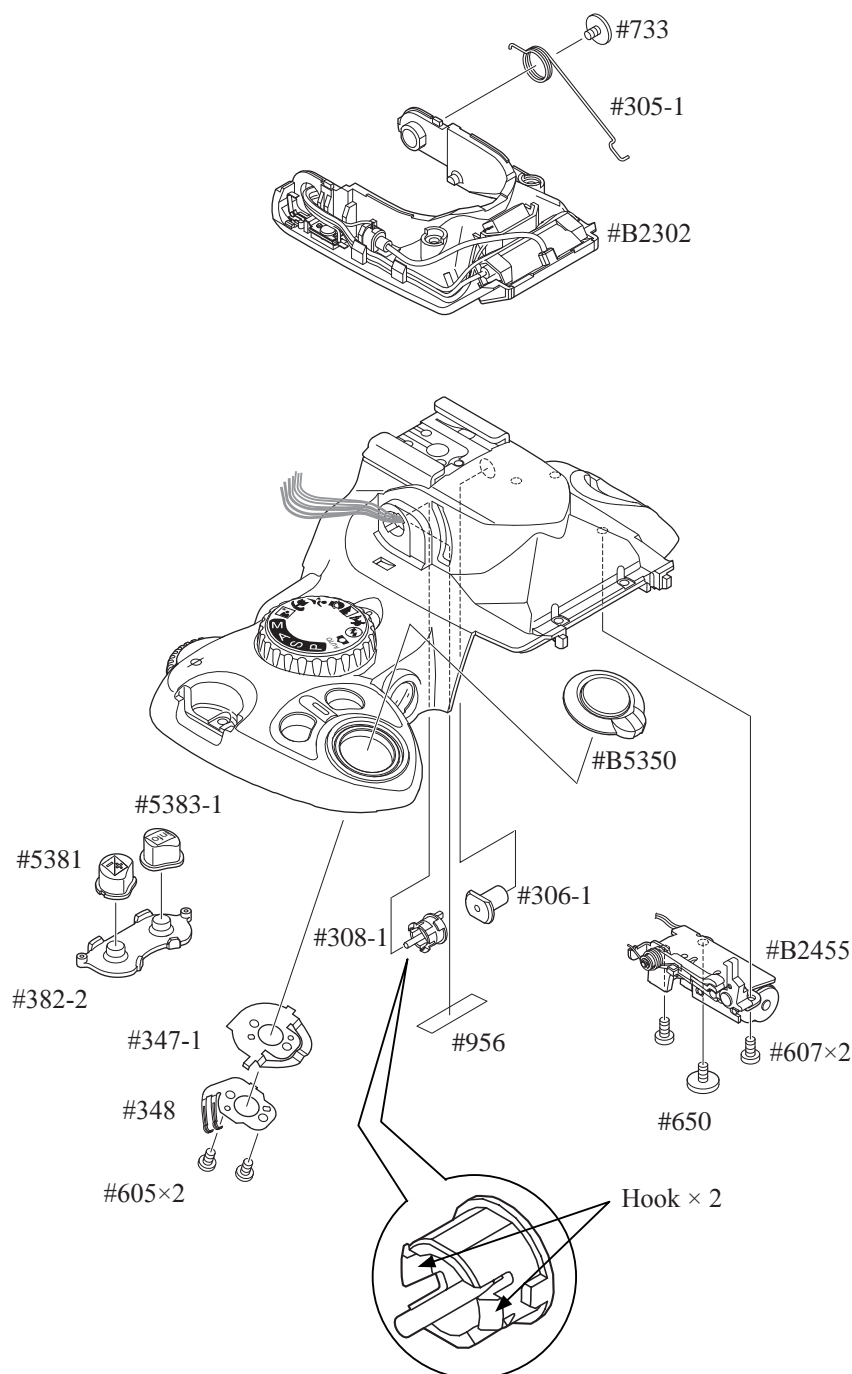
AF-assist illuminator unit

- Remove the two wires (black and uncoated) (connected from AF-assist illuminator unit).
- Take out the screw (#608), and remove the AF-assist illuminator unit (#B325-1).



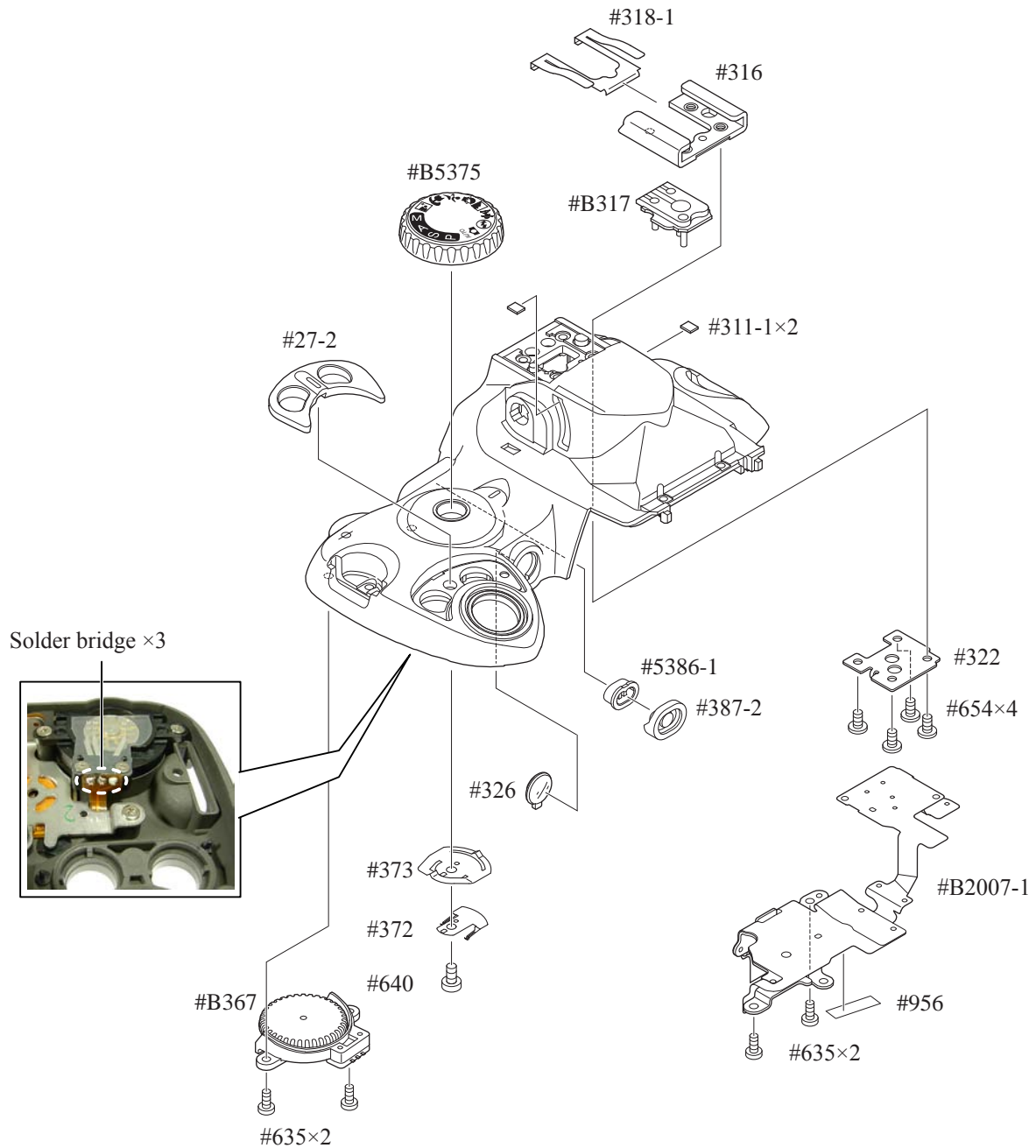
SB lower case unit / SB release base unit / Buttons

- Remove the rubber SW (#382-2), \pm Aperture button (#5381), and INFO button (#5383-1).
- Take out the two screws (#605), and remove [#348], [#347-1] and the release button unit (#B5350).
- Take out the screw (#650), and release the wire from the boss.
- Remove [#308-1], while releasing the two hooks.
- While pressing the SB case rotating shaft (#306-1), take out the screw (#733) and remove the SB-up spring (#305-1).
- While watching the wires, remove the SB lower case unit (#B2302).
- Take out the two screws (#607), and remove the SB release base unit (#B2455).



Top cover FPC unit / other small parts

- Remove the three solder bridges.
- Take out the two screws (#635) and remove the top cover FPC unit (#B2007-1).
- Remove the AF/AE lock button (#5386-1) and [#387-2].
- Take out the two screws (#635), and remove the C/D unit (#B367).
- Take out the screw (#640), and remove [#372], [#373], and mode dial unit (#B5375).
- Take out the four screws (#654), remove [#322], [#318-1], shoe base (#316) and [#B317].

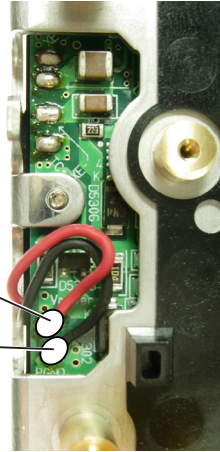


SB PCB

- Unsolder the two wires (connected from Relay-PCB).

Red: Relay-PCB

Black: Relay-PCB

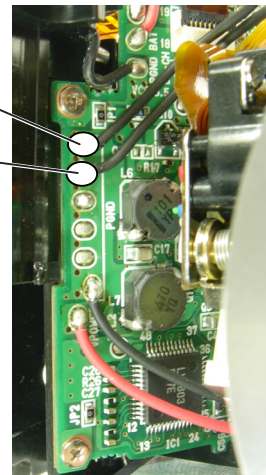


DC/DC PCB

- Unsolder the two wires (connected from Mount GND plate and Front body FPC).

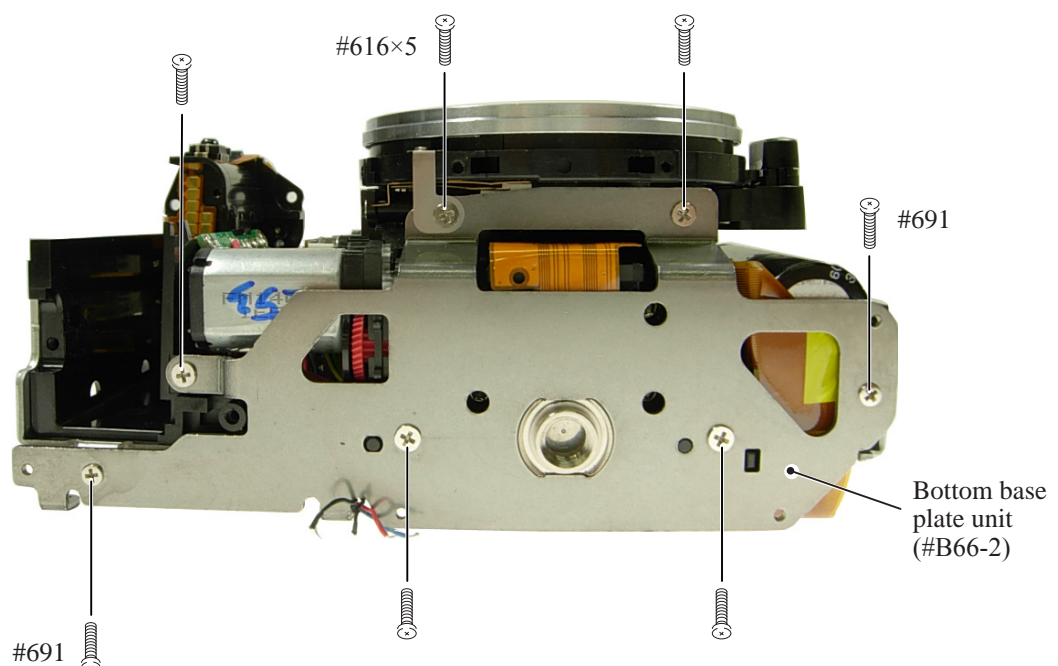
Black: Mount GND plate

Black: Front body FPC



Bottom base plate unit

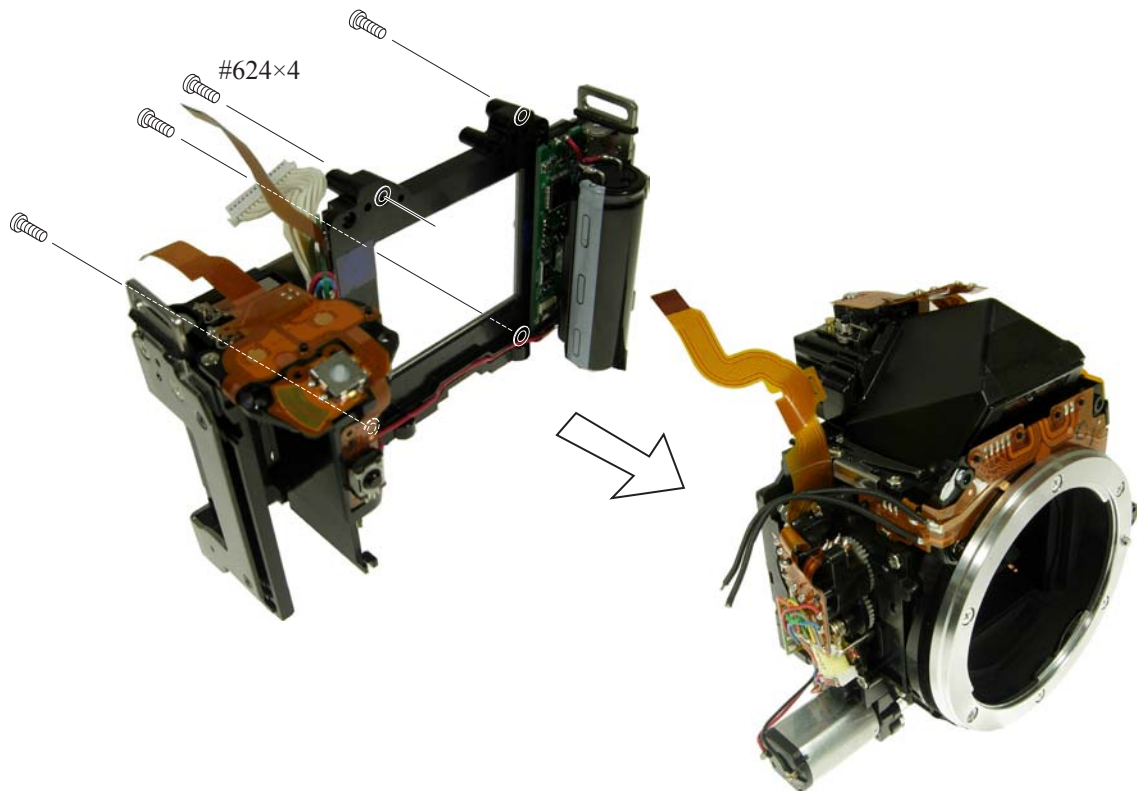
- Take out the five screws (#616).
- Take out the two screws (#691).
- Remove the bottom base plate unit (#B66-2).



Separation of Front and Rear bodies

- Take out the four screws (#624).
- Separate the front body from the rear body.

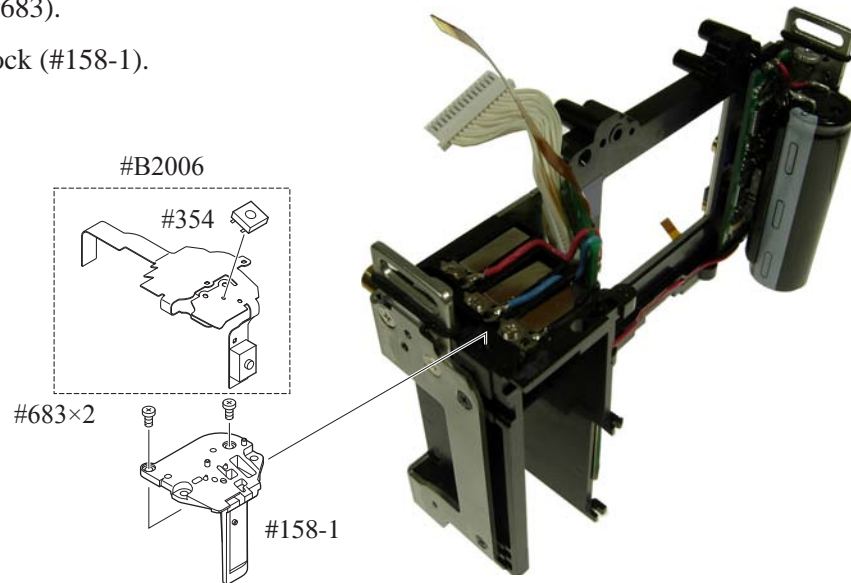
Caution: Separate them slowly so as NOT to cut the two wires of the relay-PCB that pass through between the SB PCB and main condenser.



2. Rear body

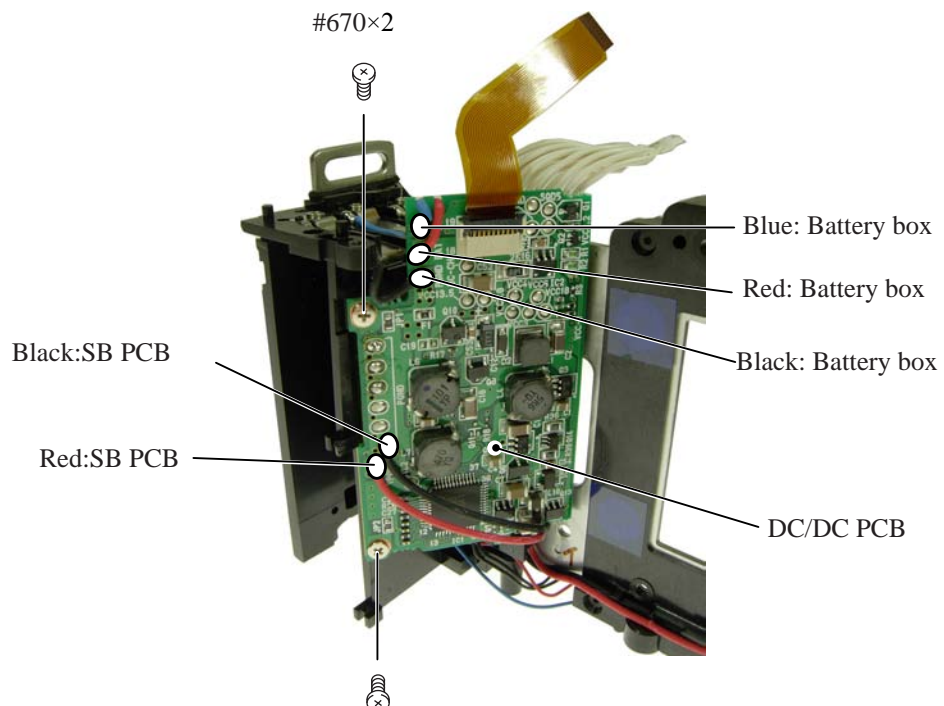
Remote block

- Remove SW-FPC [#B2006].
- Take the two screws (#683).
- Remove the remote block (#158-1).



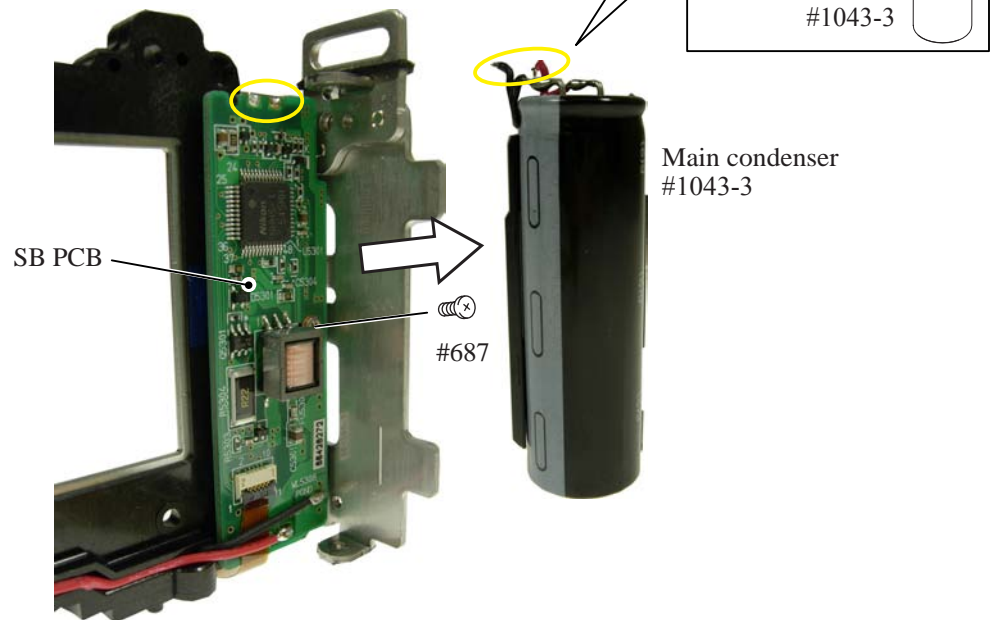
DC/DC PCB

- Remove the five wires (connected from SB-PCB and Battery box).
- Take out the two screws (#670).
- Remove the DC/DC PCB.



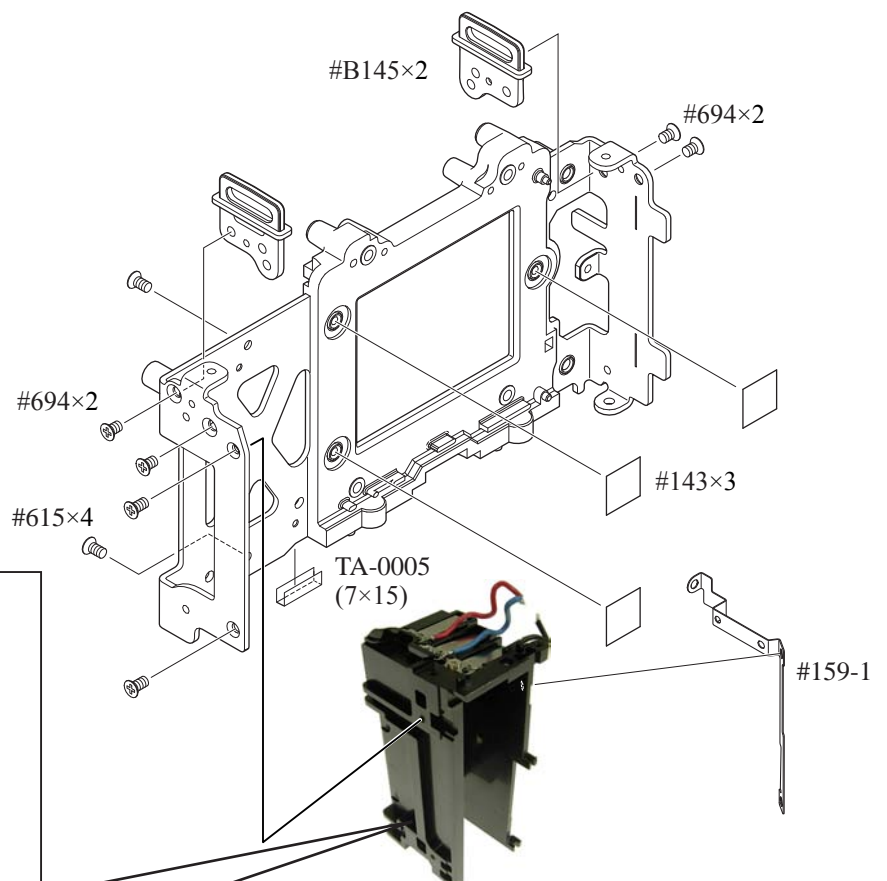
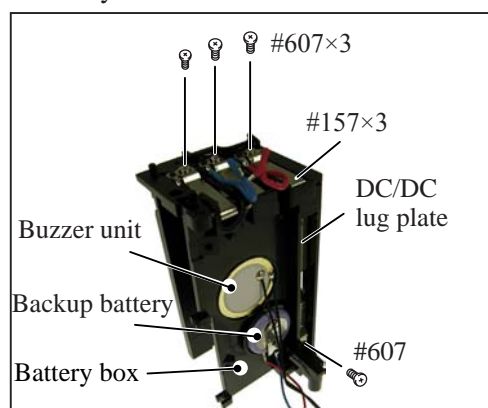
SB PCB

- Remove the two wires (yellow-circled) of the main condenser.
- Remove the main condenser that is attached on with the adhesive double-coated tape.
- Take out the screw (#687).
- Remove the SB PCB.



DC/DC lug plate
Eyelet ring unit
Other small parts

Battery box

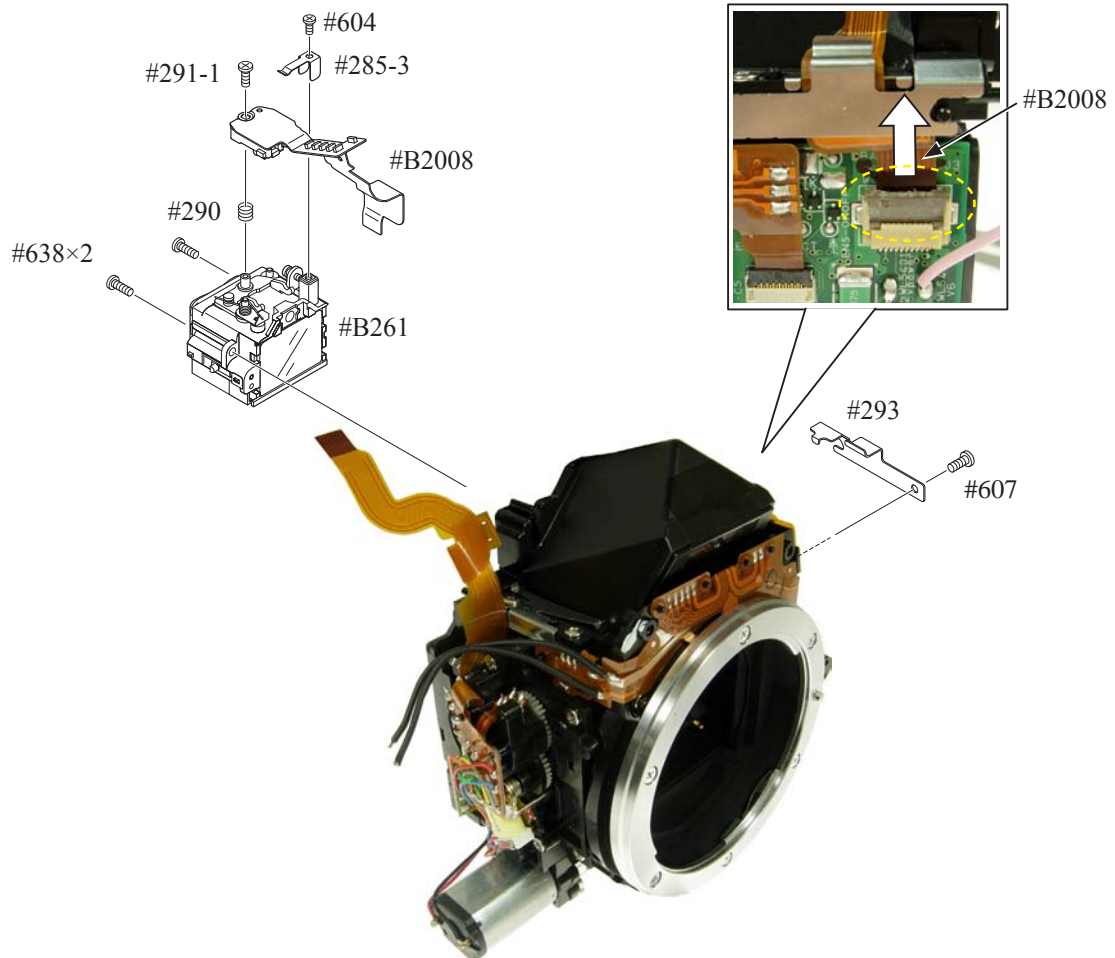


3. Front Body

Eyepiece barrel unit

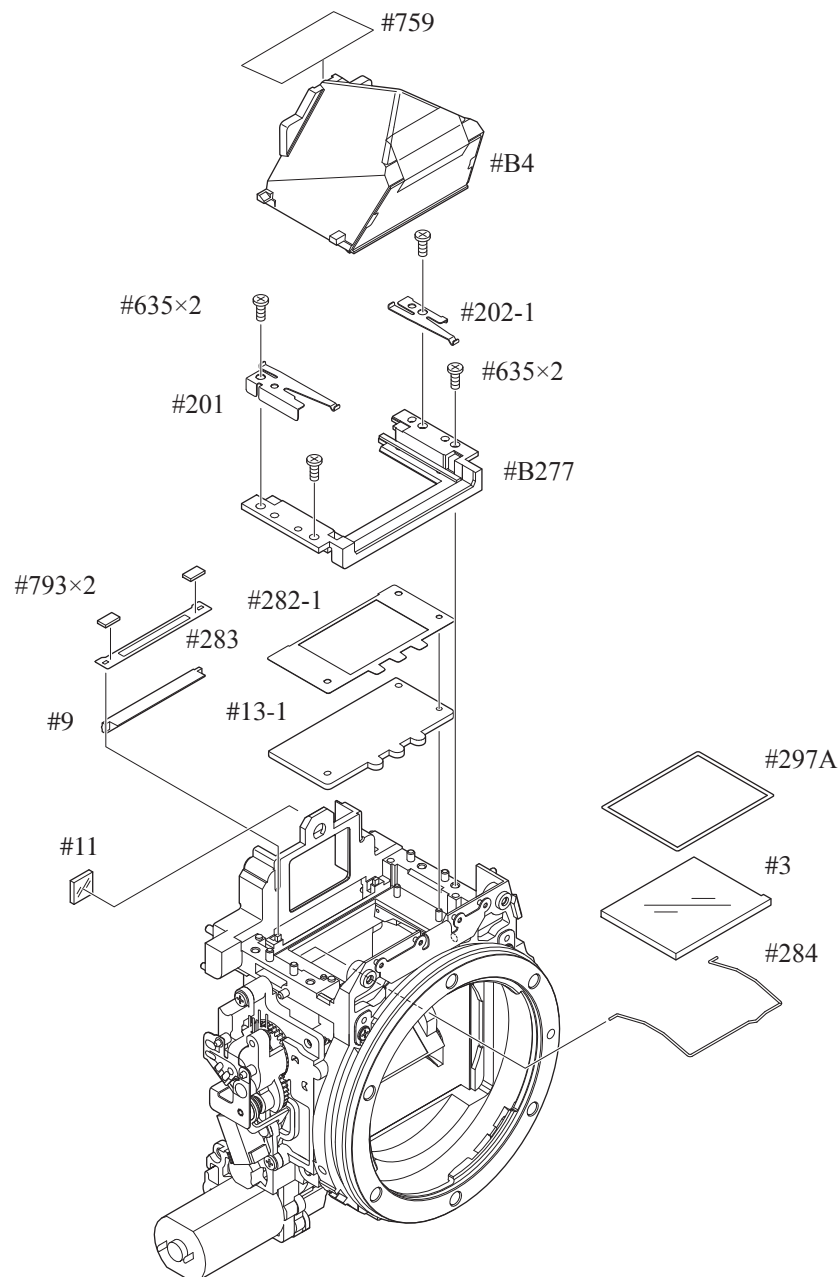
AE FPC unit

- Take out the screw (#607), and remove the AE FPC retainer plate (#293).
- Remove the FPC of the AE FPC unit (#B2008) from the connector.
- Take out the screw (#604), and remove the AE sensor plate spring (#285-3).
- Take out the screw (#291-1), and remove [#B2008] and [#290].
- Take out the two screws (#638), and remove the eyepiece barrel unit (#B261).



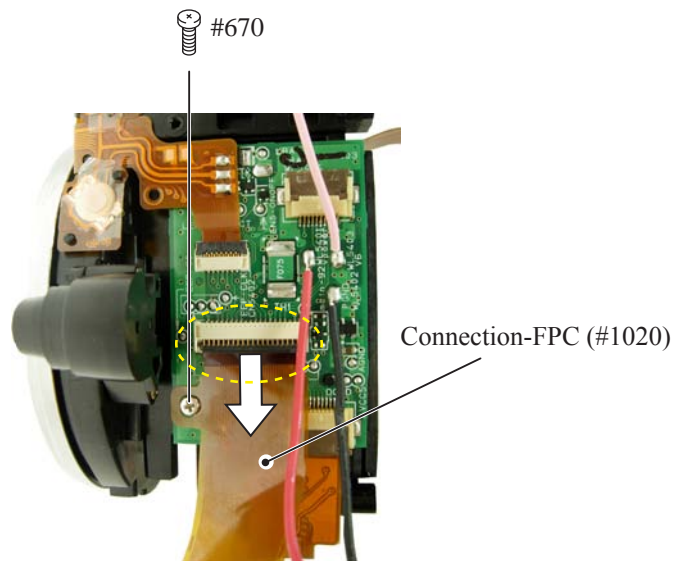
Penta unit Screen areas

- Take out the two screws (#635), and remove [#201] and [#202-1].
- Remove the hollow penta prism unit (#B4), which is adheved by Super X.
- Remove the finder field frame 2 (#283).
- Take out the two screws (#635), and remove the SI retaining unit (#B277).
- Remove the finder field frame 1 (#282-1).
- Remove the in-finder display prism (#9).
- Remove the SI display plate (#13-1).
- Remove [#284], [#3], and [#297A].



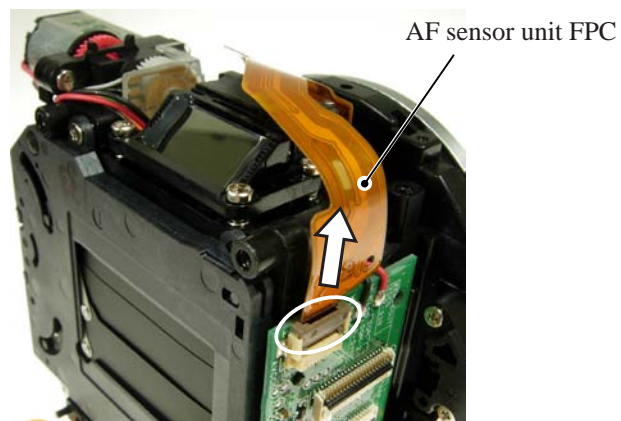
Connection-FPC

- Take out the screw (#670).
- Remove the connection-FPC (#1020) from the connector.



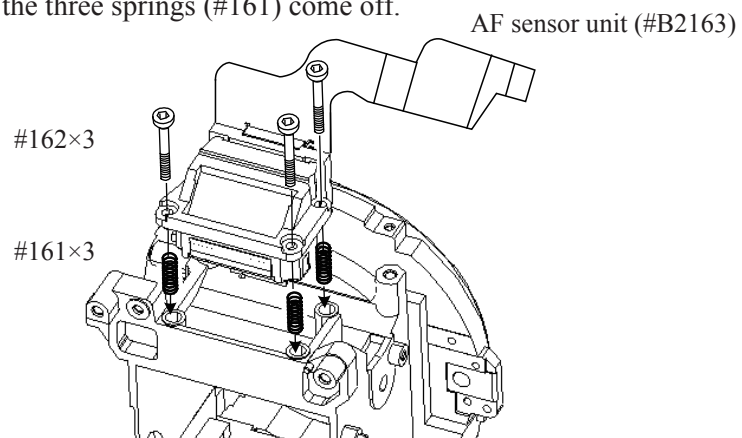
AF sensor unit

- Disconnect the AF sensor unit FPC from the connector.



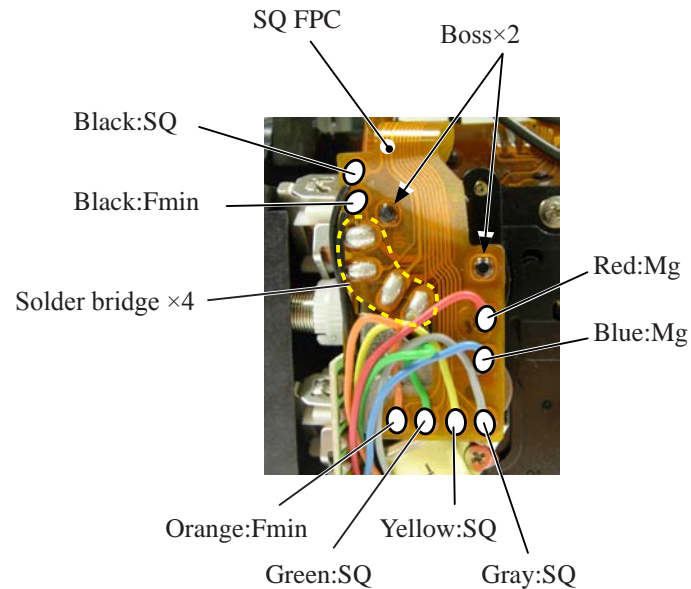
- Take out the three screws (#162) with hexagonal wrench ($\phi 1.5\text{mm}$).

The AF sensor unit (#B2163) and the three springs (#161) come off.



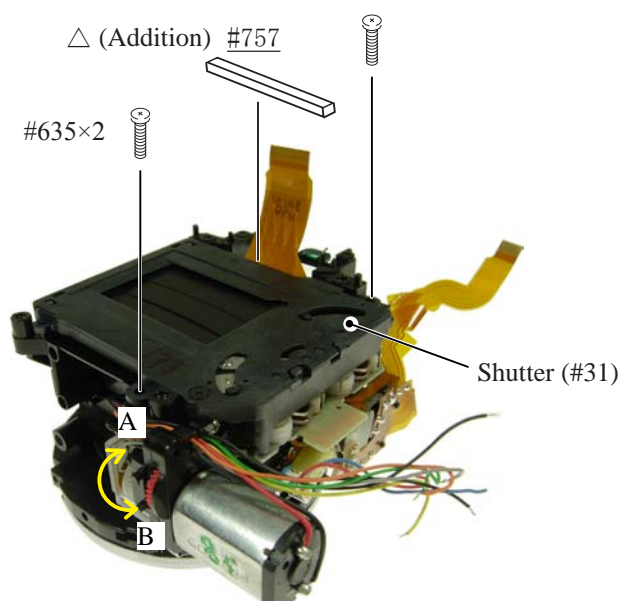
SQ FPC

- Unsolder eight wires (connected from SQ, Fmin, and Mg).
- Remove the four solder bridges.
- Remove the SQ FPC by releasing from the bosses.



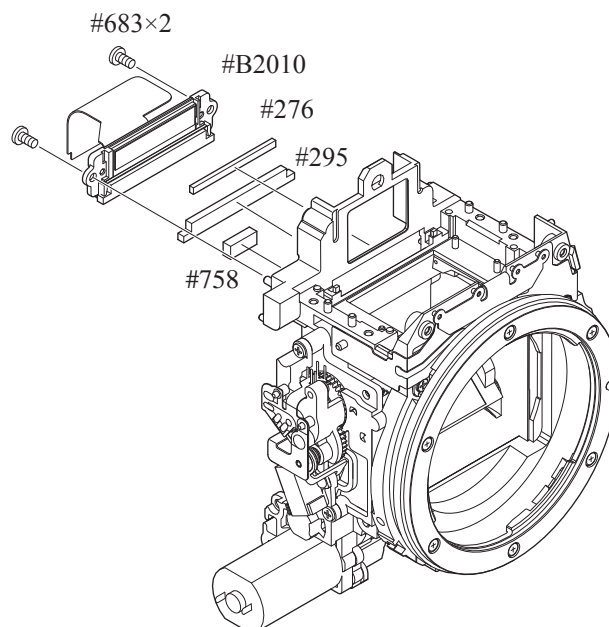
Shutter unit

- Turn the white gear in the direction of "A", and raise the mirror.
- Remove [#757]. △ (Addition)
- Take out the two screws (#635).
- Remove the shutter unit (#31).
- Turn the white gear in the direction of "B", and get the mirror down.



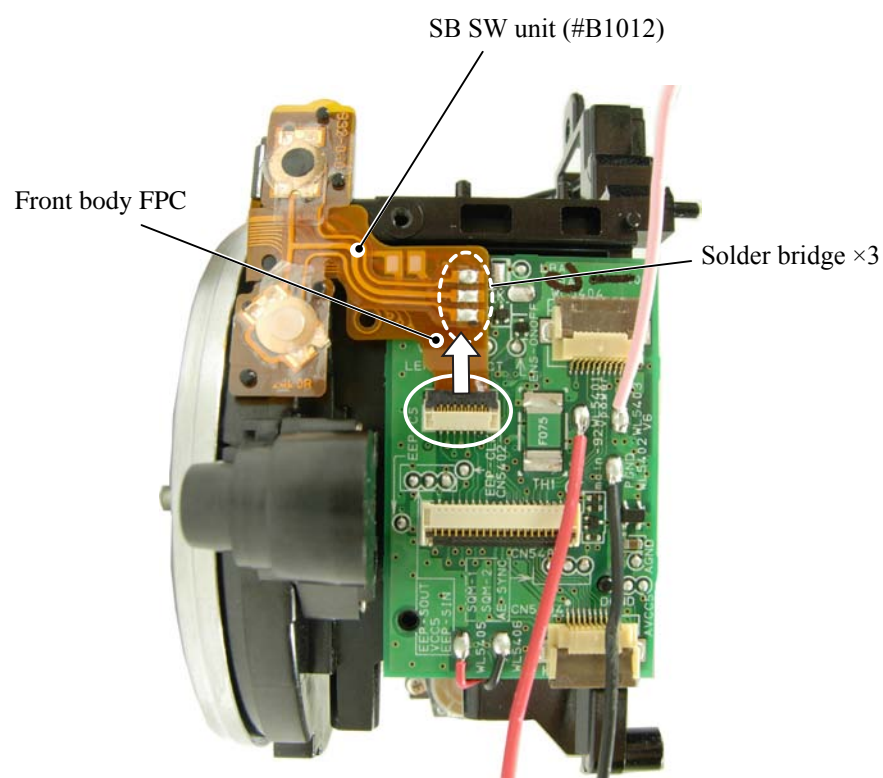
In-finder LCD unit

- Take out the two screws (#683).
- Remove the in-finder LCD unit (#B2010).



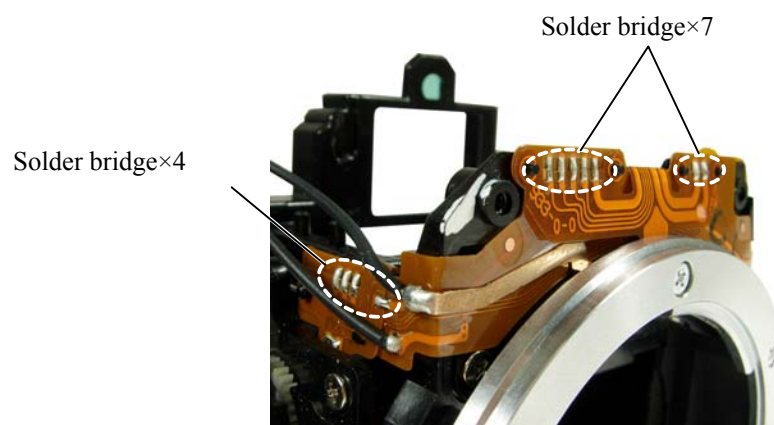
SB SW unit

- Remove the three solder bridges.
- Remove the SB SW unit.
- Remove the front body FPC from the connector.

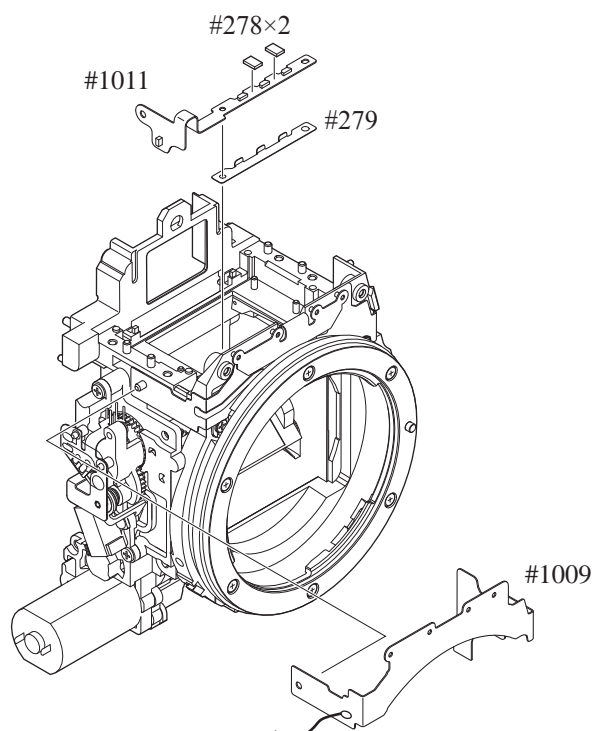


Front body FPC
SI LED-FPC

- Remove the seven solder bridges and the other four solder bridges.

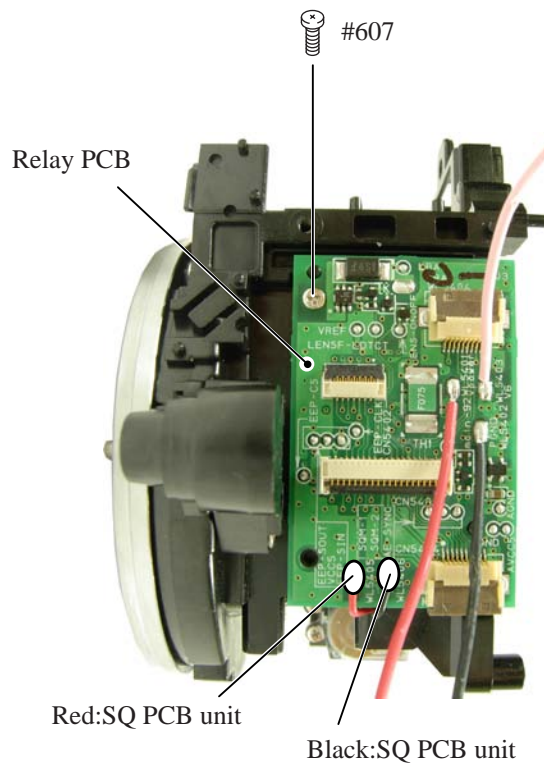


- Remove the SI LED-FPC (#1011) and [#279].
- Remove the front body FPC (#1009).



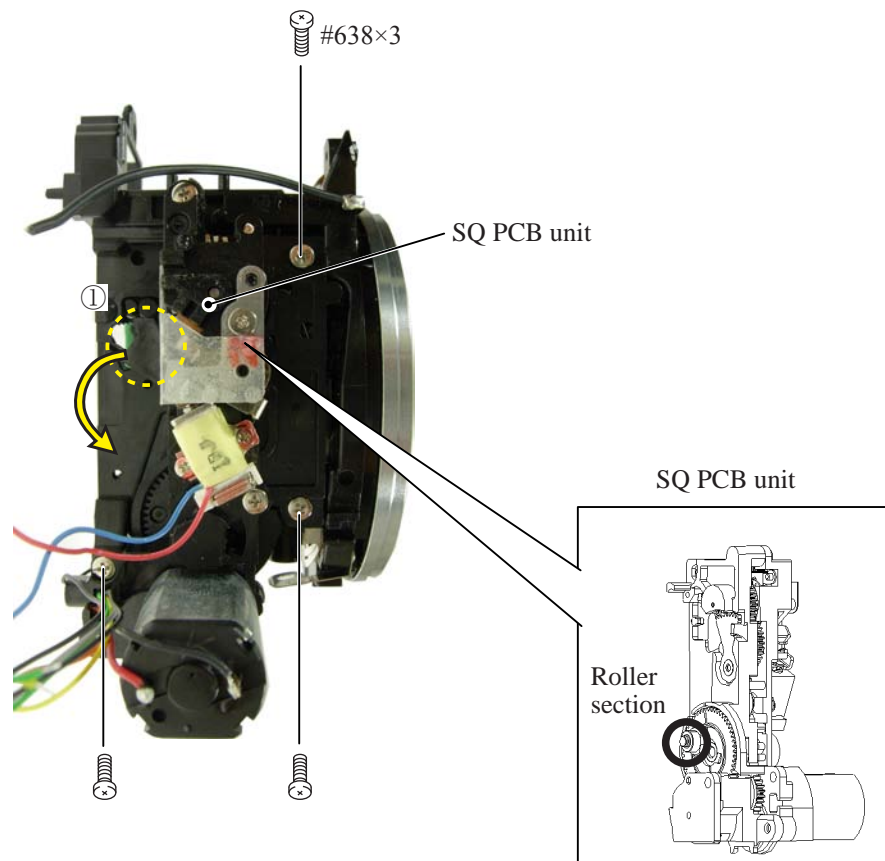
Relay PCB

- Unsolder the two wires (connected from SQ PCB unit).
- Take out the screw (#607).
- Remove the relay PCB.

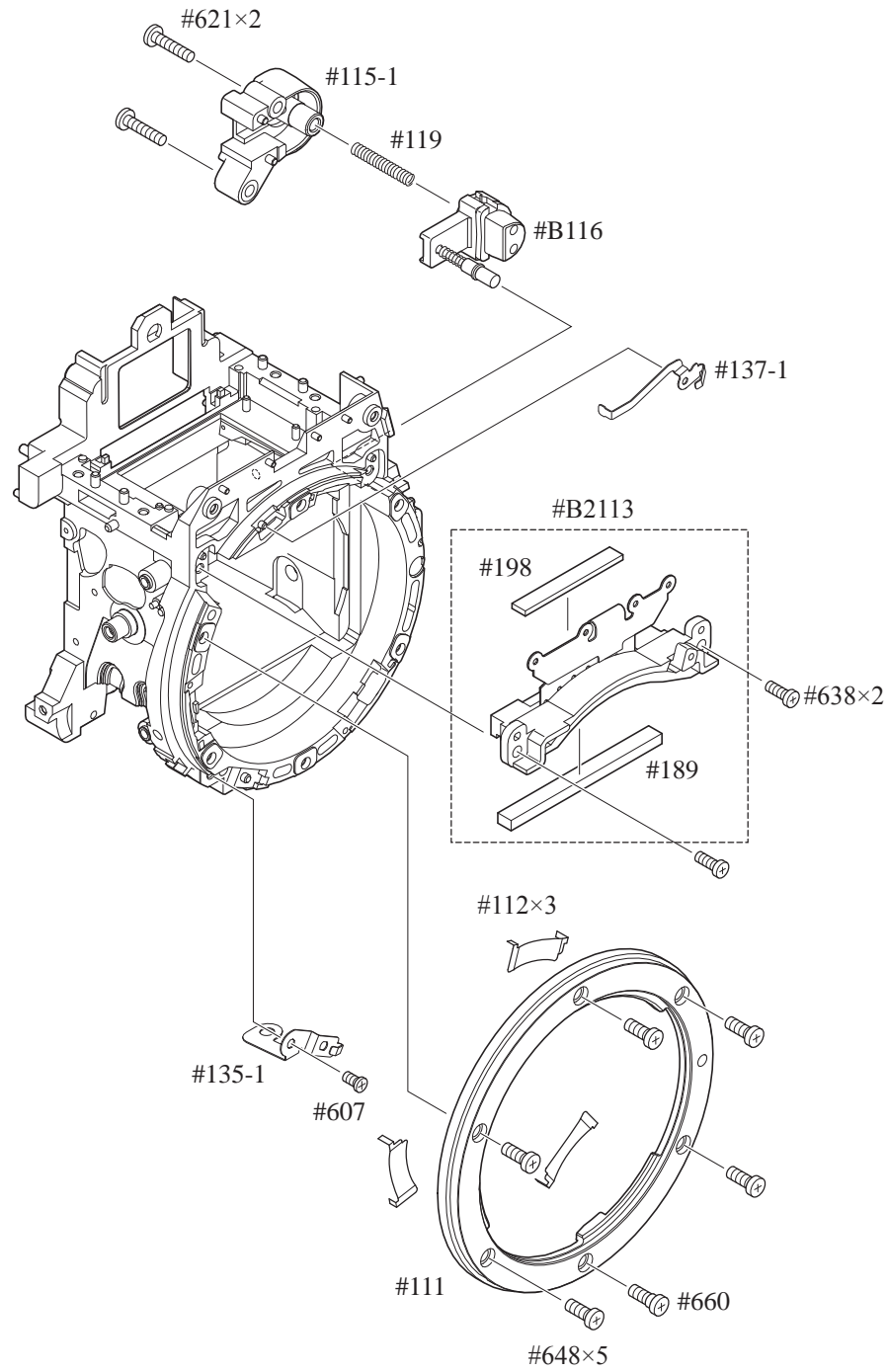


SQ PCB unit

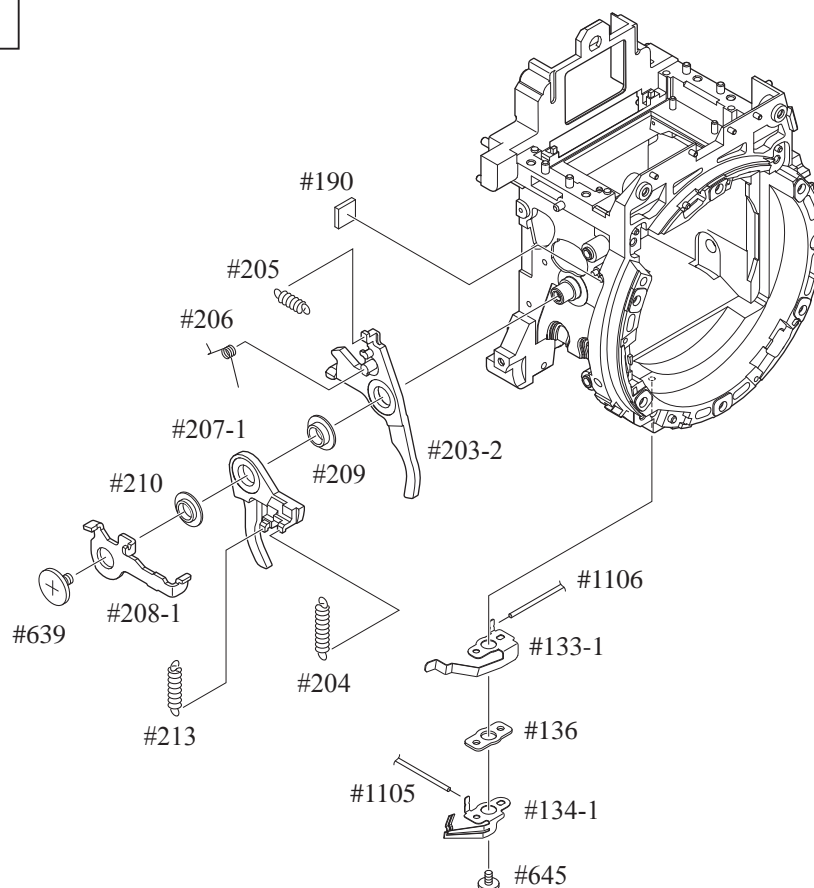
- Take out the three screws (#638).
- Turn " ① " part in the direction of the arrow, and remove the SQ PCB unit, while releasing from the roller section.



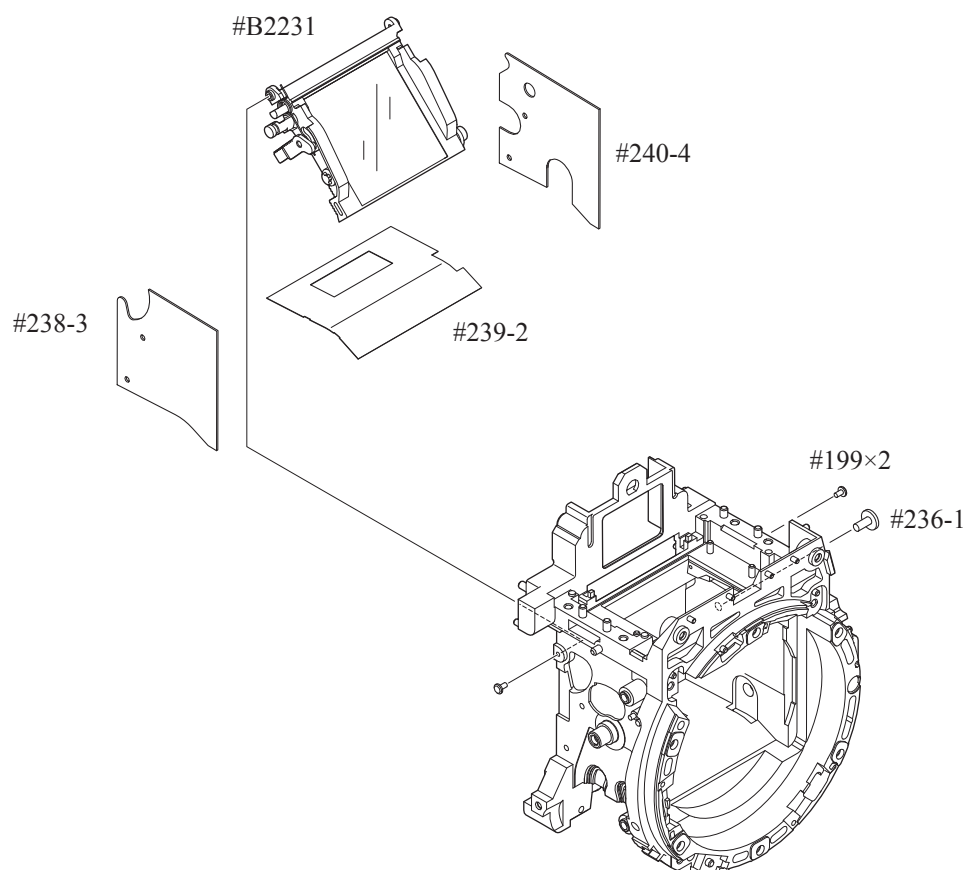
Bayonet /
A/M-change SW /
Lens-contact areas



Aperture lever /
F-min SW areas



Mirror unit

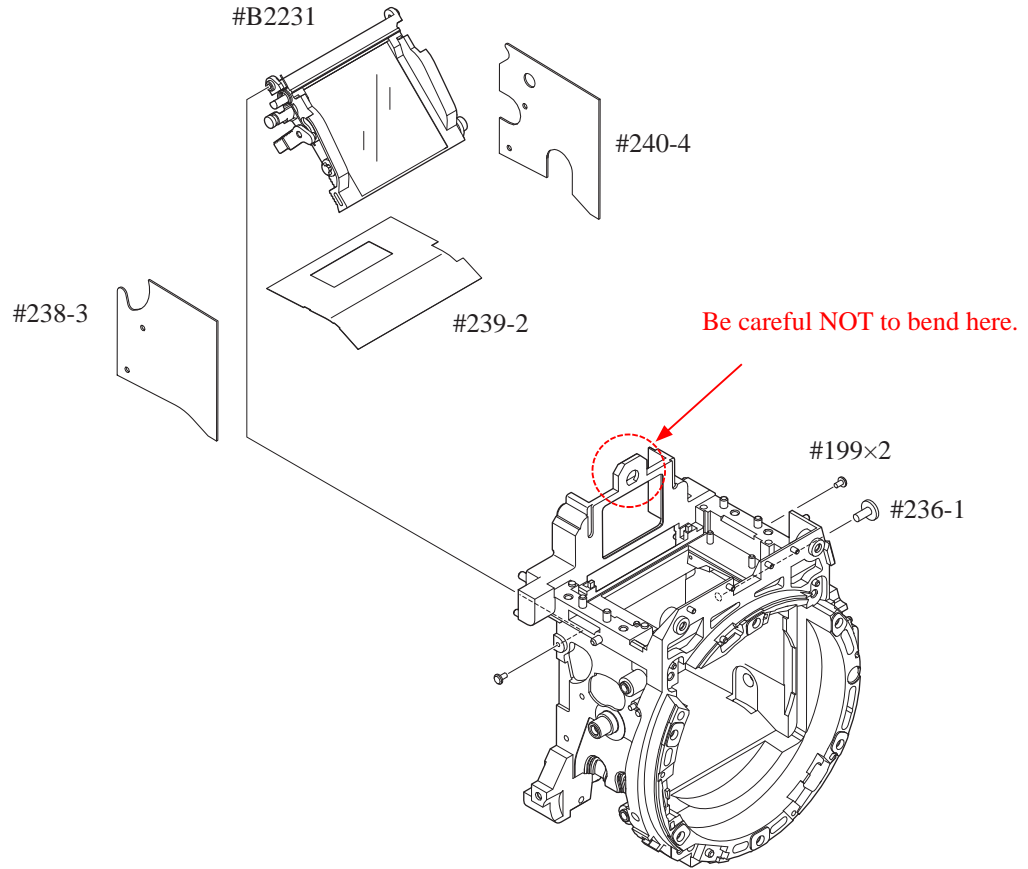


Assembly/ Adjustment

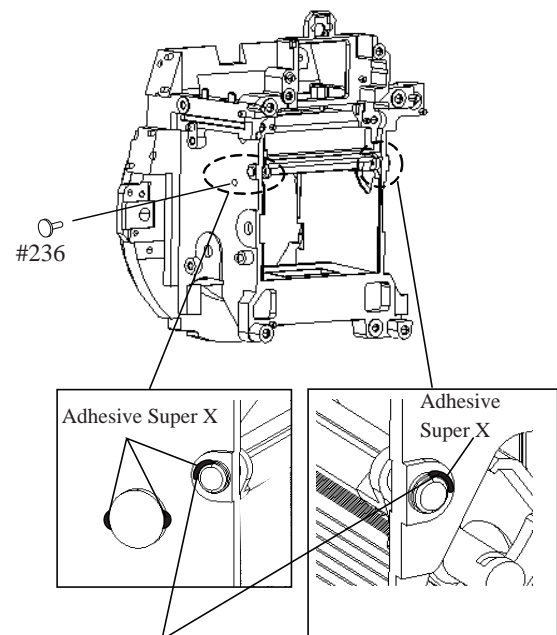
- NOTE: For undescribed tapes and sponges here in "Assembly", refer to PARTS LIST.

1. Front body

Mirror unit

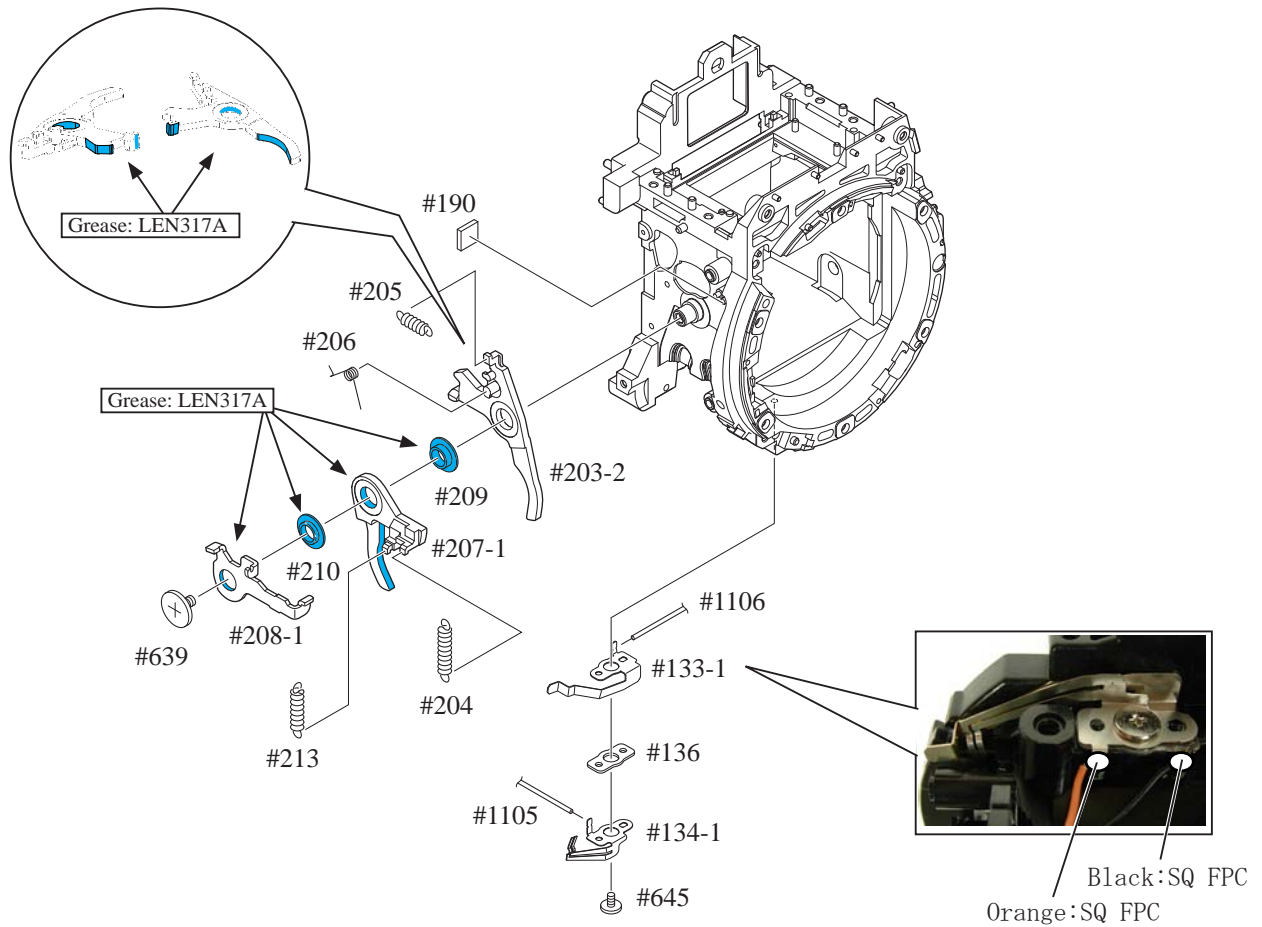


- With the mirror being raised, assemble the pins and apply the adhesive (Super X) on each pin.



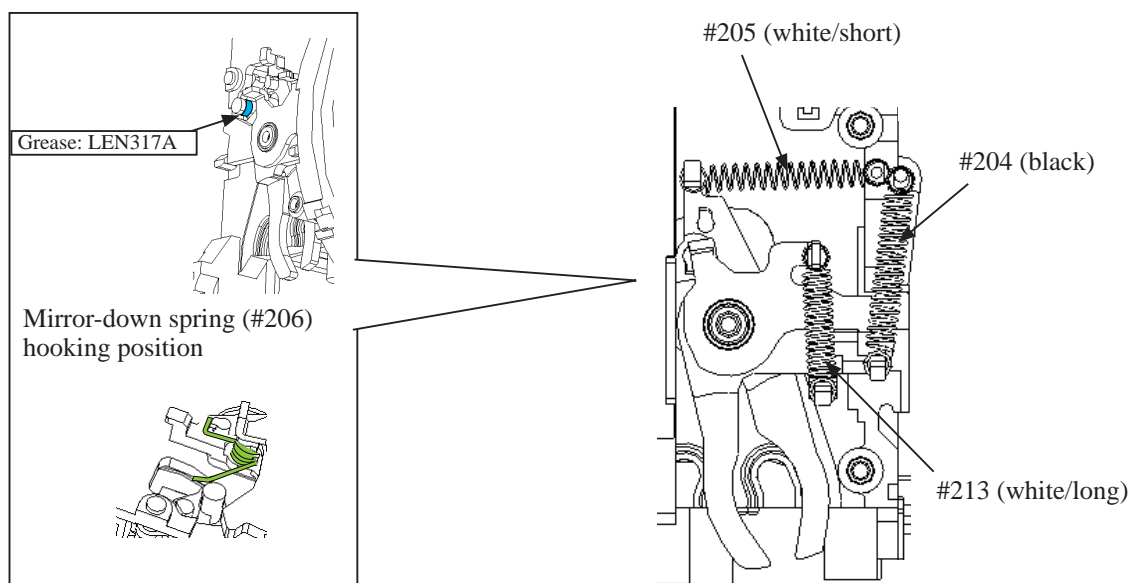
Apply the adhesive only on 1/4 periphery of the pin on mount side.

Aperture lever
F-min SW areas



Position for hooking spring

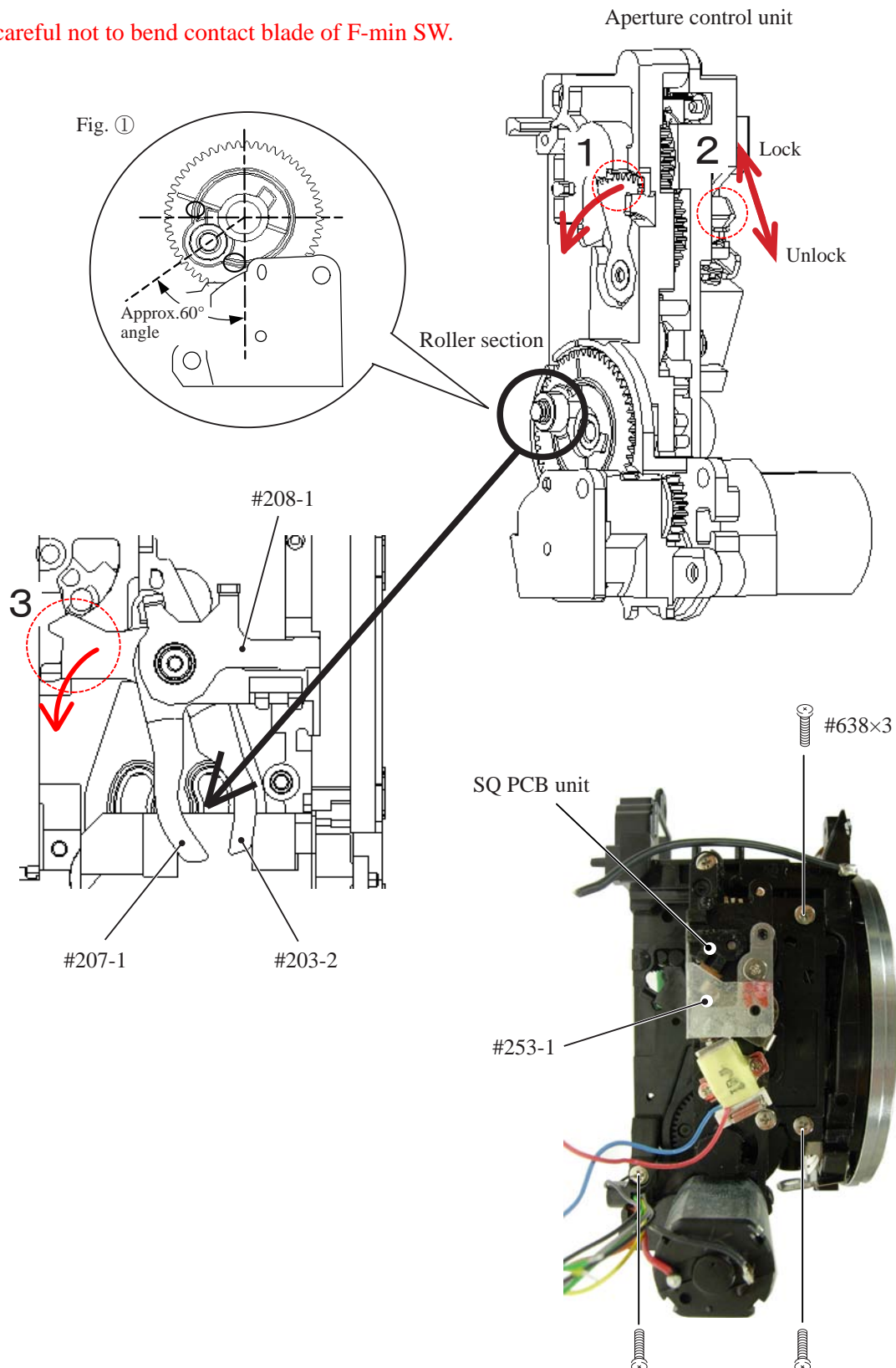
- Hook [#205] and then [#204].
- Hook [#213].



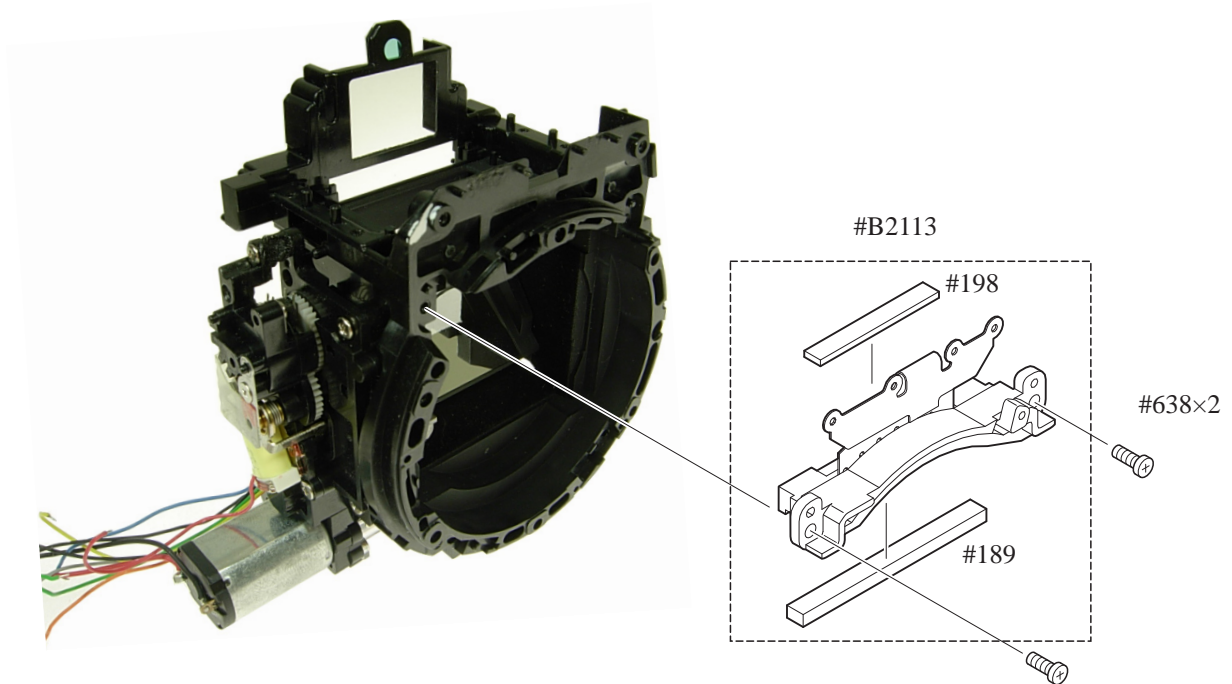
SQ PCB unit

- Move the roller section to the position as shown in Fig. ① .
- Turn " 1 " all the way to the end in the direction of the arrow. Then, Press " 2 " in the direction of "Lock".
- Turn " 3 ", and insert the roller section between [#207-1] and [#203-2].
- Tighten the three screws (#638).
- Press " 2 " in the direction of "Unlock".

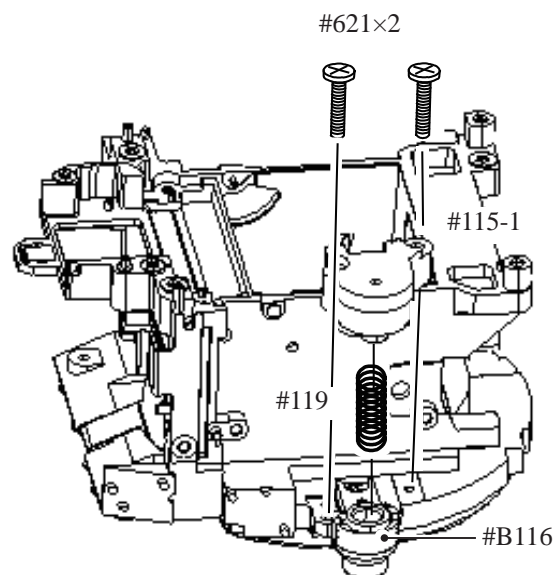
Note: Be careful not to bend contact blade of F-min SW.



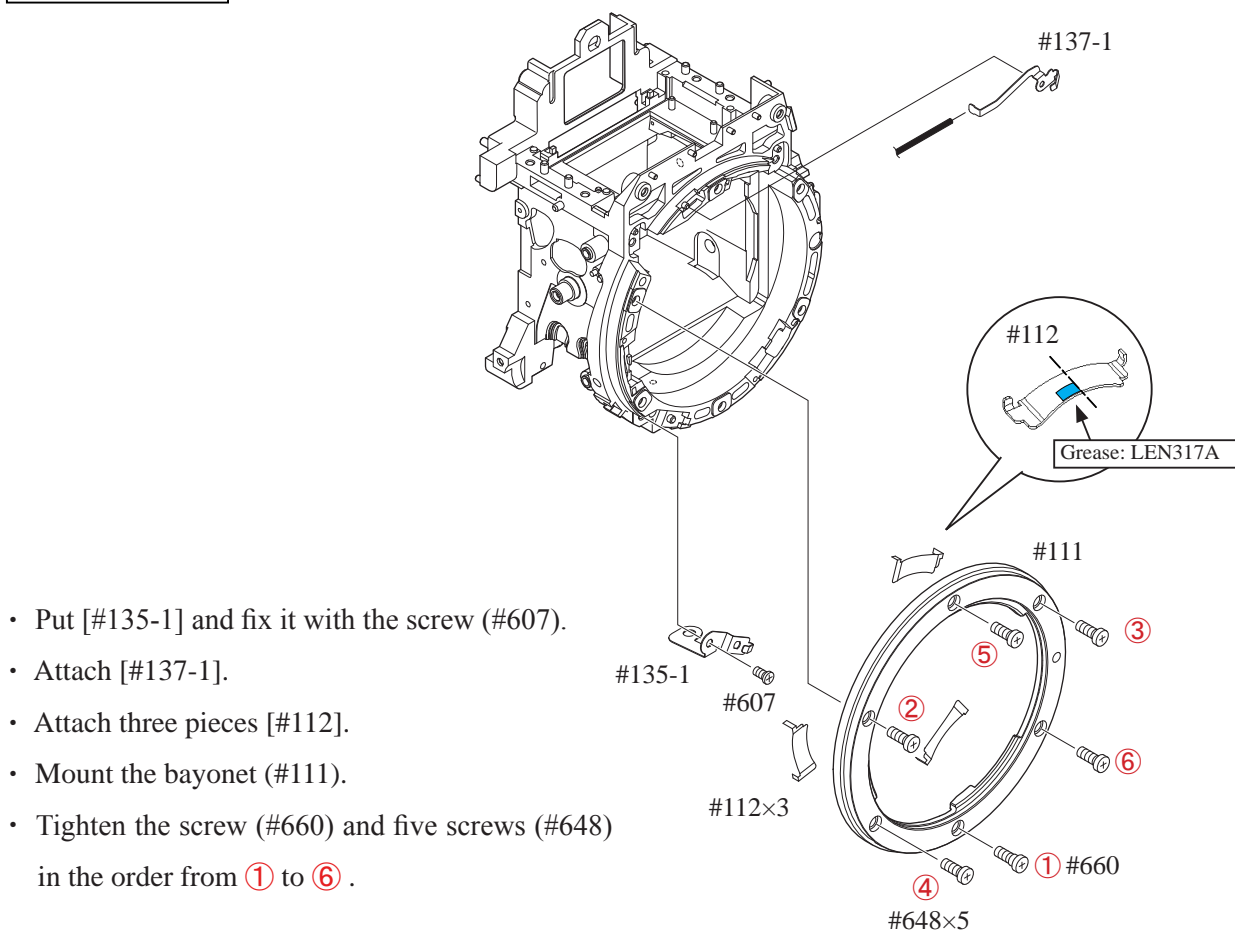
Lens contacts unit



Release button unit



Bayonet Mount GND plate



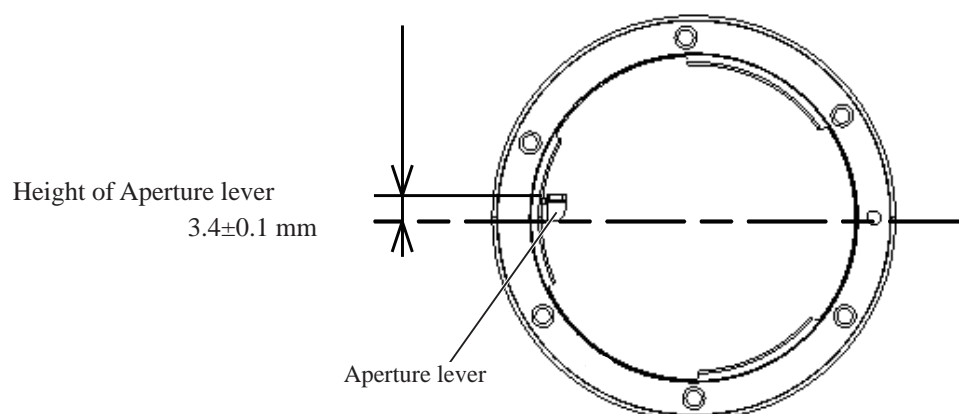
Height adjustment of Aperture lever

- Measure the height of the aperture lever by using the tool (J18004).

Standard: $3.4 \pm 0.1 \text{ mm}$

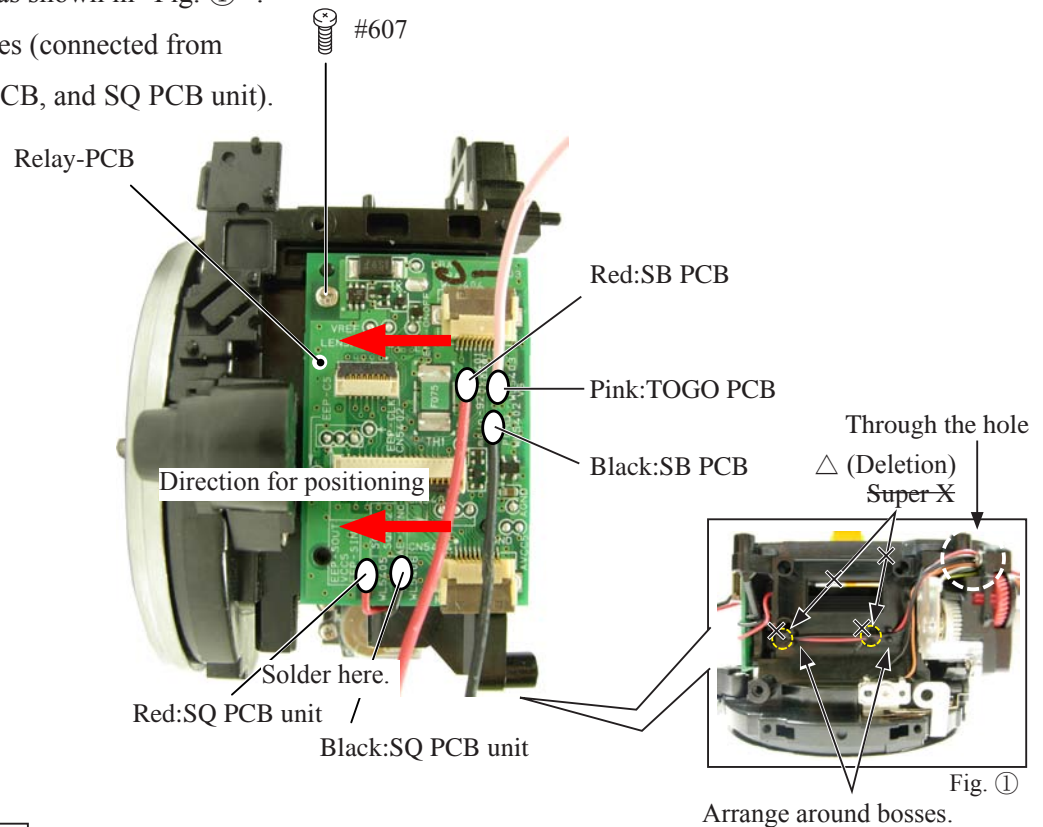
In case the value is out of standard, make an adjustment by bending the aperture lever.

Be careful NOT to bend the inner part of the lever when adjusting.



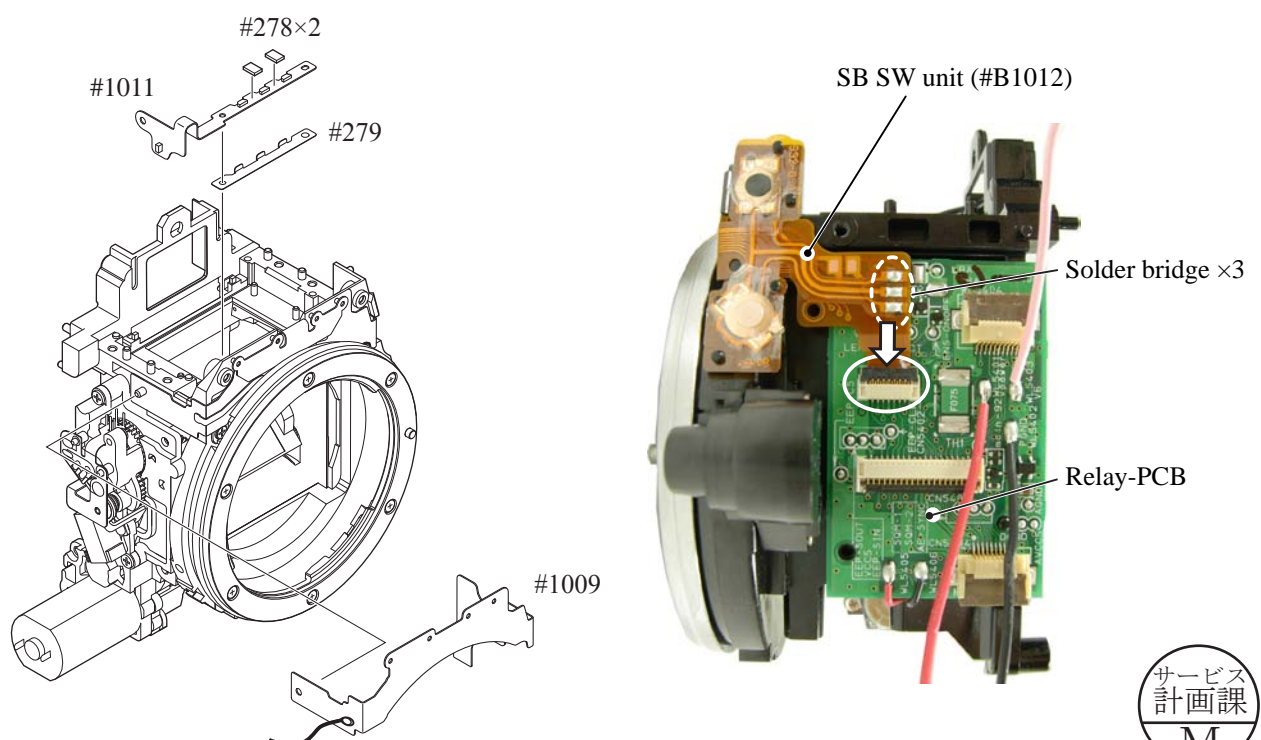
Relay-PCB unit

- Mount the relay-PCB unit (#1004-1) in the direction for positioning, and fix it with the screw (#607).
- Arrange the wires as shown in "Fig. ①".
- Solder the five wires (connected from SB-PCB, TOGO PCB, and SQ PCB unit).

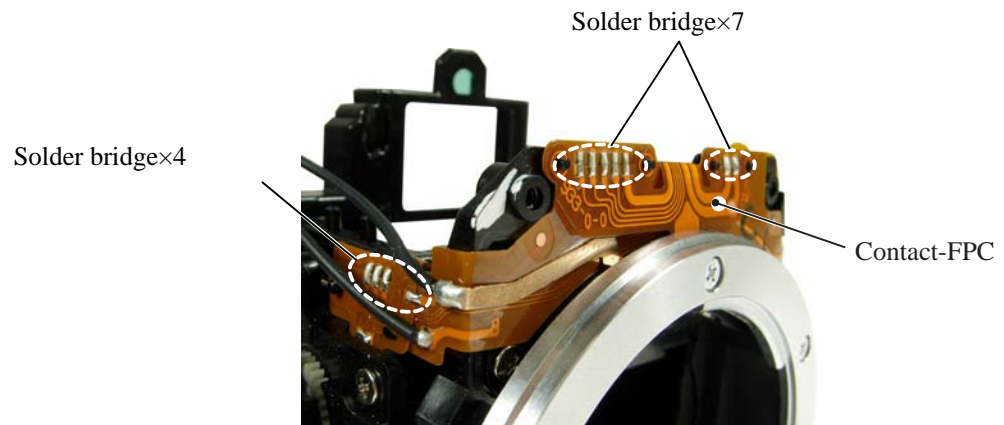


Front body FPC unit

- Attach the front body-FPC (#1009), and connect it to the connector of the relay-PCB unit.
- Attach the SI diffusing plate (#279) and SI-LCD FPC (#1011) and two pieces (#278).
- Mount the SB SW unit (#B1012).
- Make the three solder bridges.

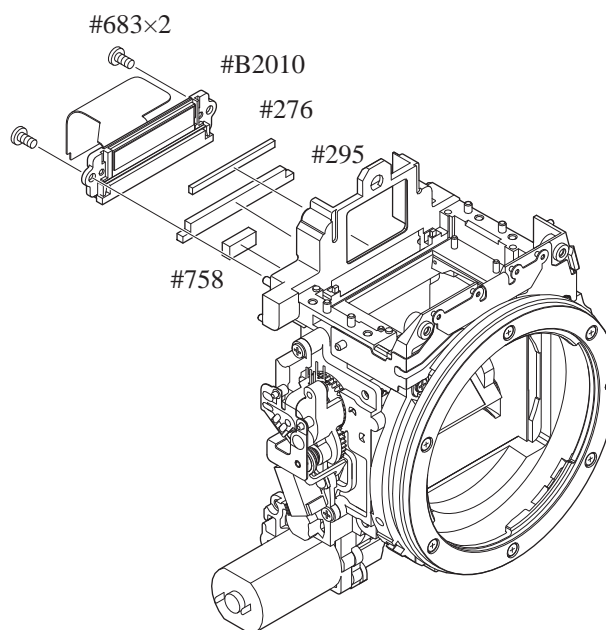


- Fold the contact-FPC down, and attach it by fitting the four bosses in the holes.
- Make seven solder bridges and four solder bridges.



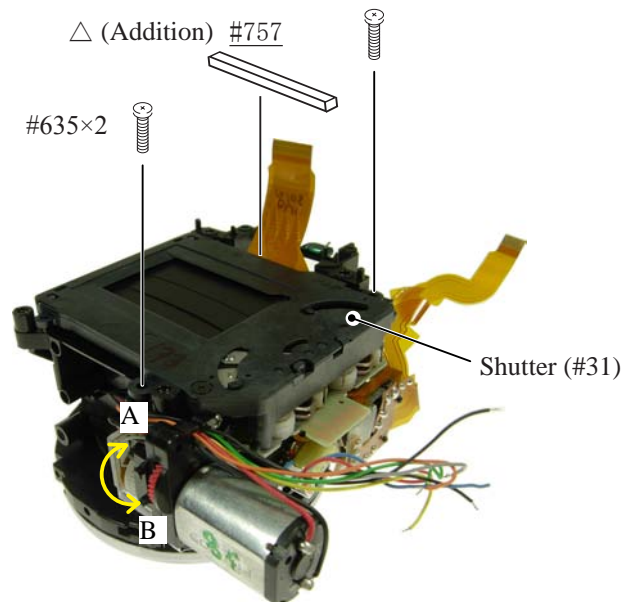
In-finder LCD unit

- Fix the in-finder LCD unit (#B2010) with the two screws (#683).



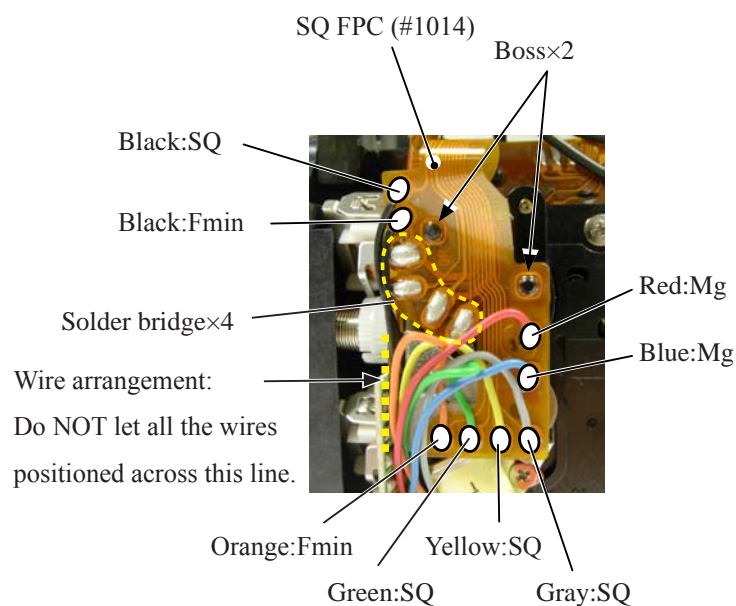
Shutter unit

- Turn the white gear in the direction of "A", and raise the mirror.
- Mount the shutter unit (#31), and fix it with two screws (#635).
- Turn the white gear in the direction of "B", and let the mirror down.
- Attach [#757]. △ (Addition)



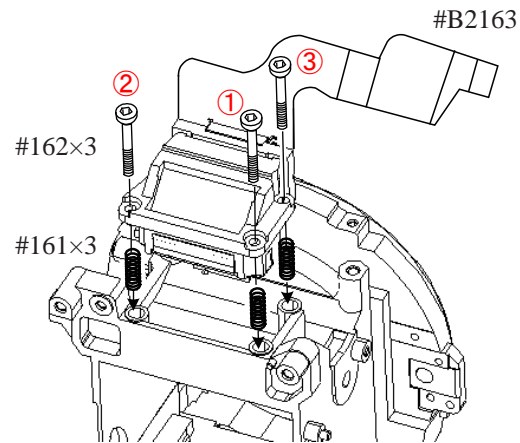
SQ FPC

- Attach the SQ FPC (#1014) by fitting the bosses of the SQ-PCB unit in the holes.
- Make five solder bridges.
- Solder the eight wires (connected from SQ, Fmin, and Mg).

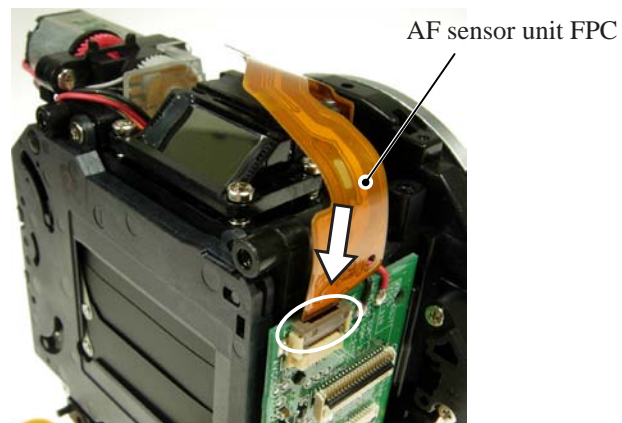


AF sensor unit

- Put three springs (#161) and mount the AF sensor unit [#B2163].
- Turn three screws (#162) with Hexagonal wrench ($\phi 1.5\text{mm}$) in the order from ① to ③ all the way lightly to the end, then give each two-turns counterclockwise.

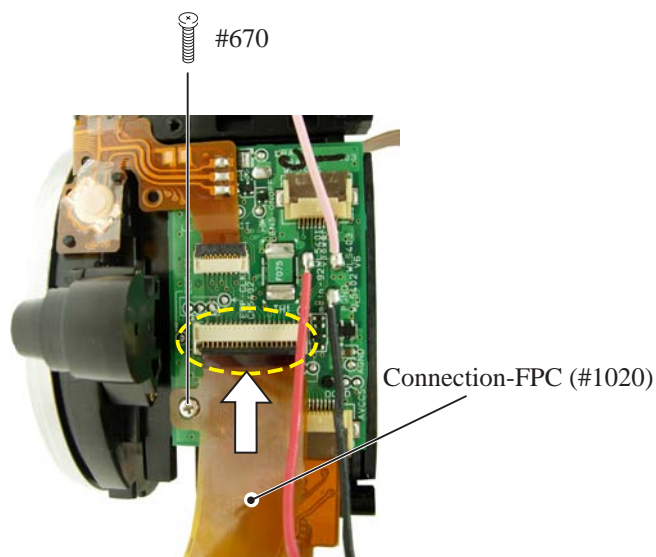


- Attach the AF sensor unit FPC by conforming to the external shape, and connect it to the connector.



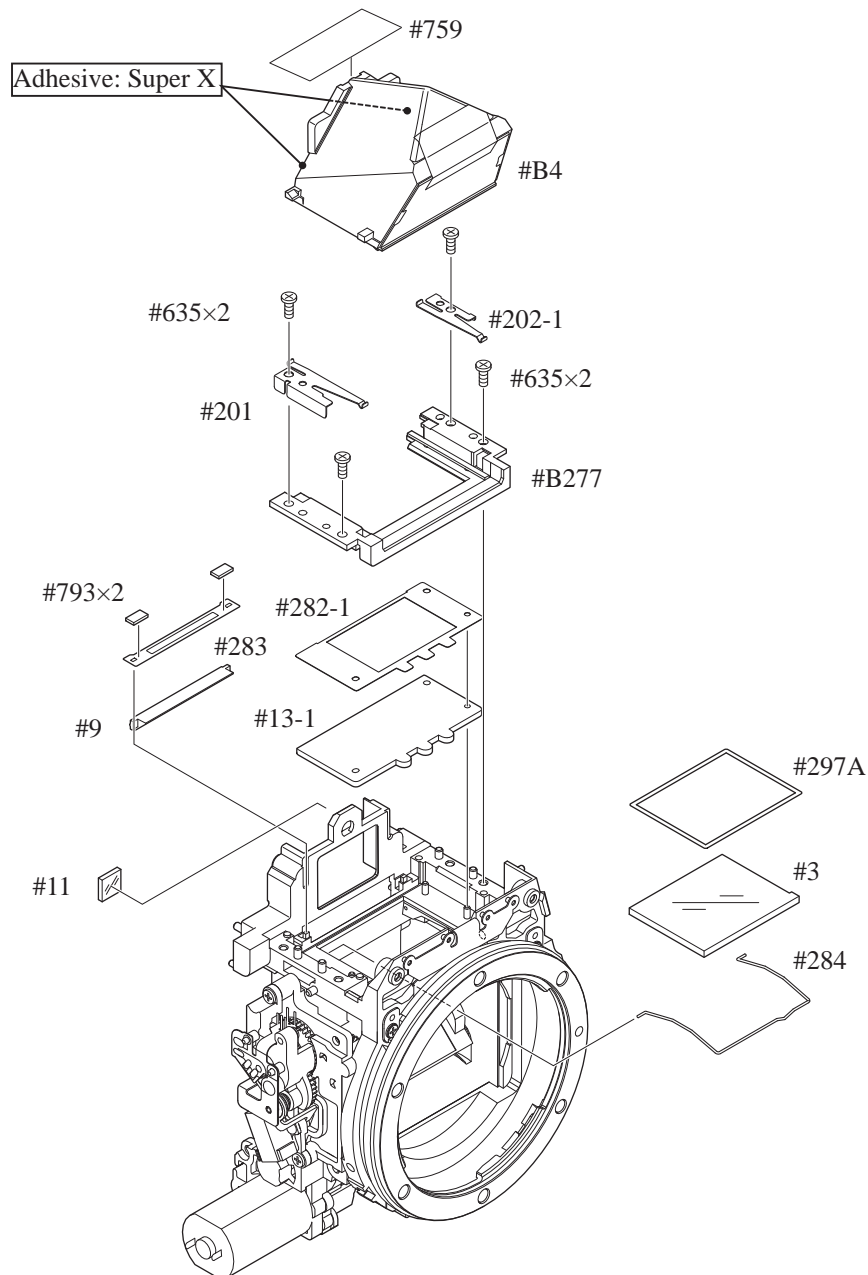
Connection-FPC

- Connect the connection-FPC (#1020) to the connector, and fix it with the screw (#670).



Penta unit
Screen areas

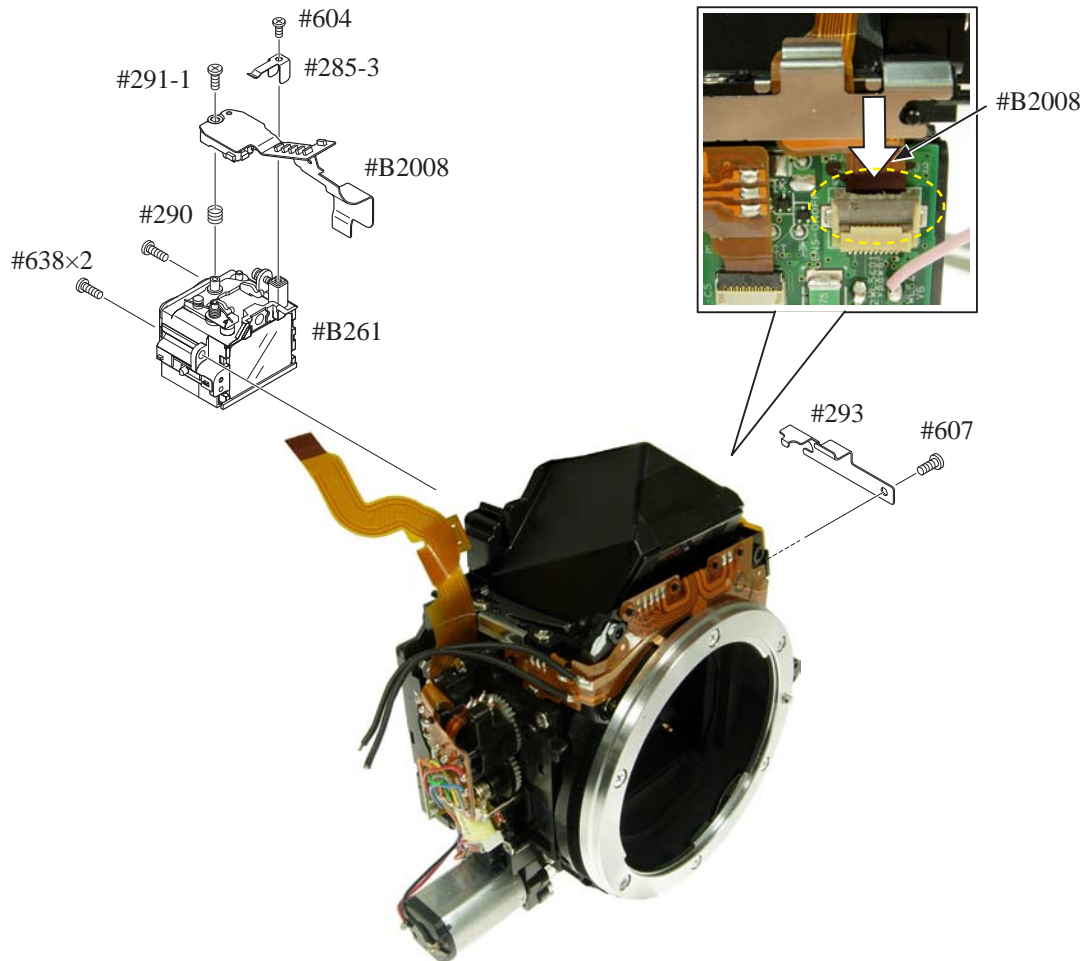
- Mount SI (#13-1).
- Mount the finder field frame 1 (#282-1).
- Attach the in-finder display prism (#9).
- Mount the SI-retaining unit (#B277) and fix it with two screws (#635).
- Mount the finder field frame 2 (#283).
- Mount the hollow penta (#B4).
- Attach the penta-retaining springs (#201 and #202-1) and fix them each with the two screws (#635).
- Mount [#284], then [#3] and [#297A].



Eyepiece barrel unit

AE FPC unit

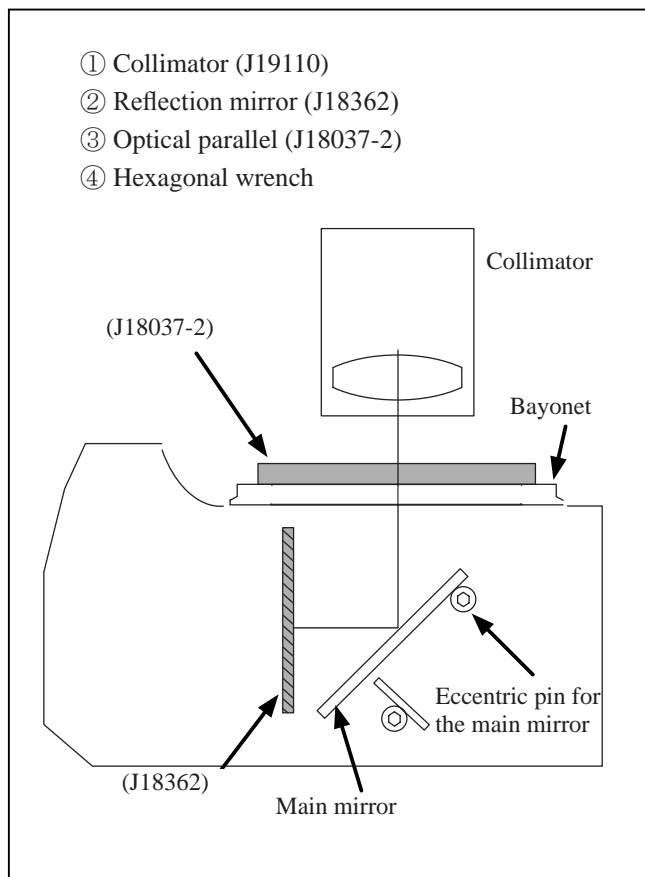
- Mount the eyepiece barrel unit (#B261), and fix it with two screws (#638).
- Put the AE sensor adjusting-spring [#290] and AE FPC unit [#B2008], then fix them with the screw (#291-1).
- Put the AE sensor plate-spring (#285-3), and fix it with the screw (#604).
- Connect the FPC of the AE FPC unit (#B2008) to the connector.
- Put the AE FPC retainer plate (#293), and fix it with the screw (#607).



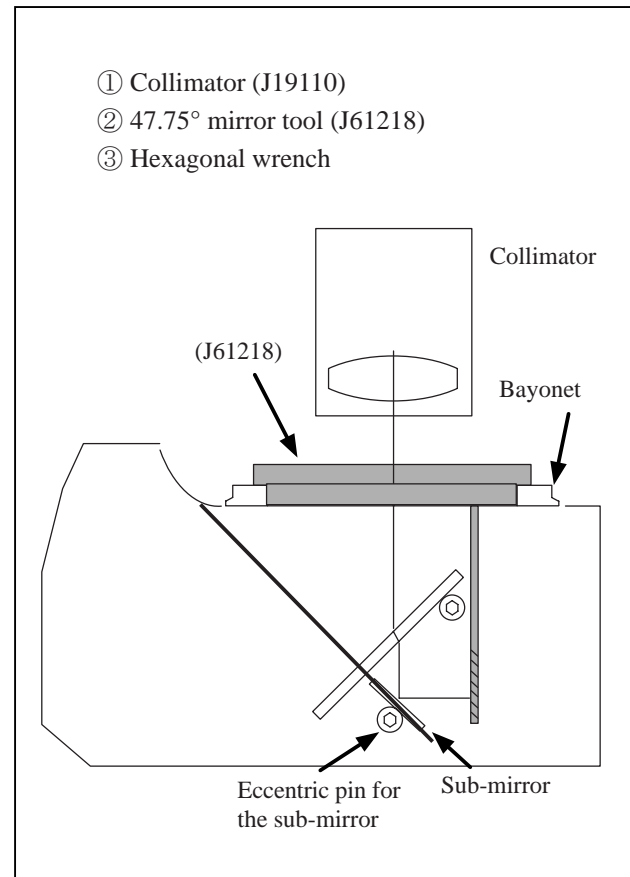
Angle inspection and adjustment of Main mirror and sub-mirror

* Device:

1. Main mirror 45° inspection and adjustment



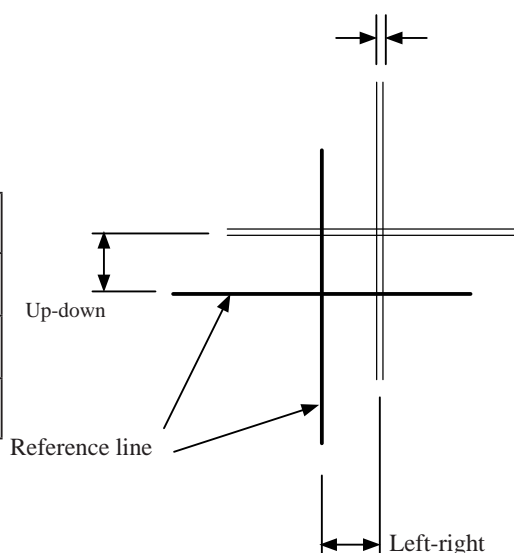
2. Sub-mirror 47.75° inspection and adjustment



Width of line indicates deviation

* Standard

	Main mirror	Sub-mirror
Left-right deviation	$\pm 25'$	—
Up-down deviation	$\pm 5'$	$0' \pm 3'$
Distortion	6' or less	6' or less

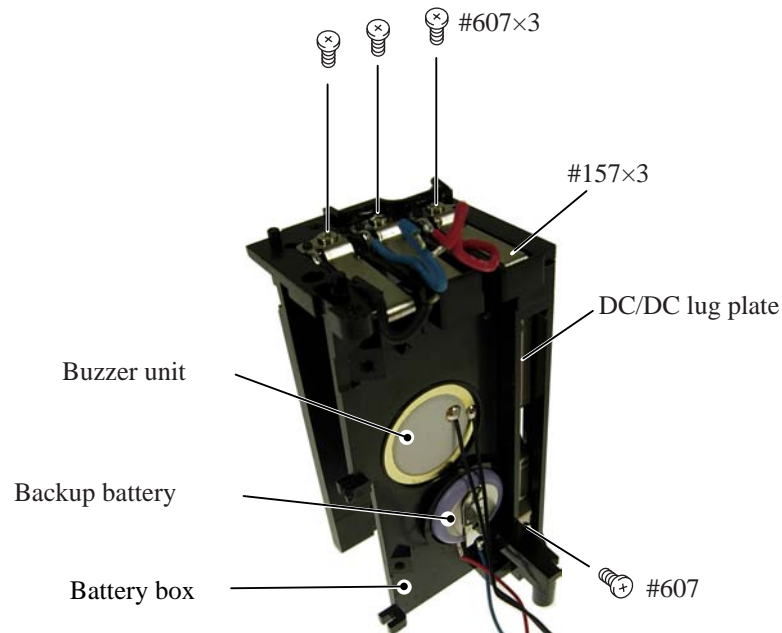


* Caution:

- Before and after the adjustment, check the accuracy by moving the main mirror up- and downwards a few times.
- Check for the up-down deviation. In case the result is out of standard, make an adjustment by turning the eccentric pin with Hexagonal wrench.
- In case the the result of checking up-downward and right-leftward deviation is out of standard, the front plate area or mirror unit should be defective.
- In case inspection and adjustment are made for the mirror only in the front body, check again after assembling the front body into the rear body.

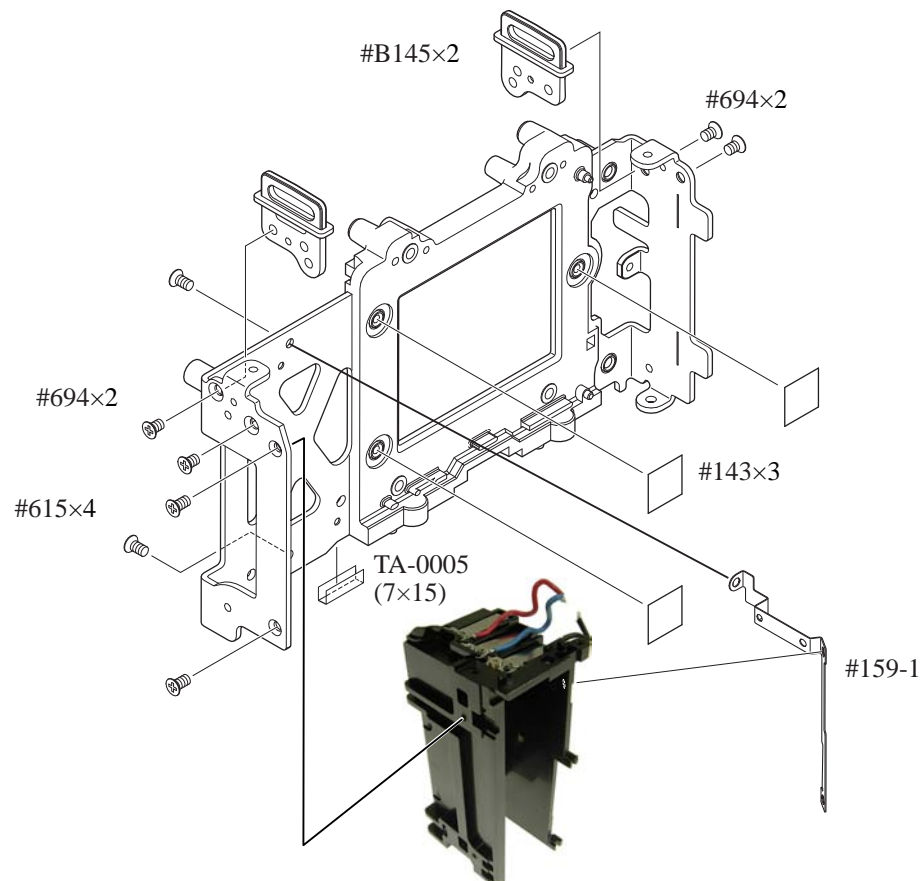
2. Rear body

Battery box



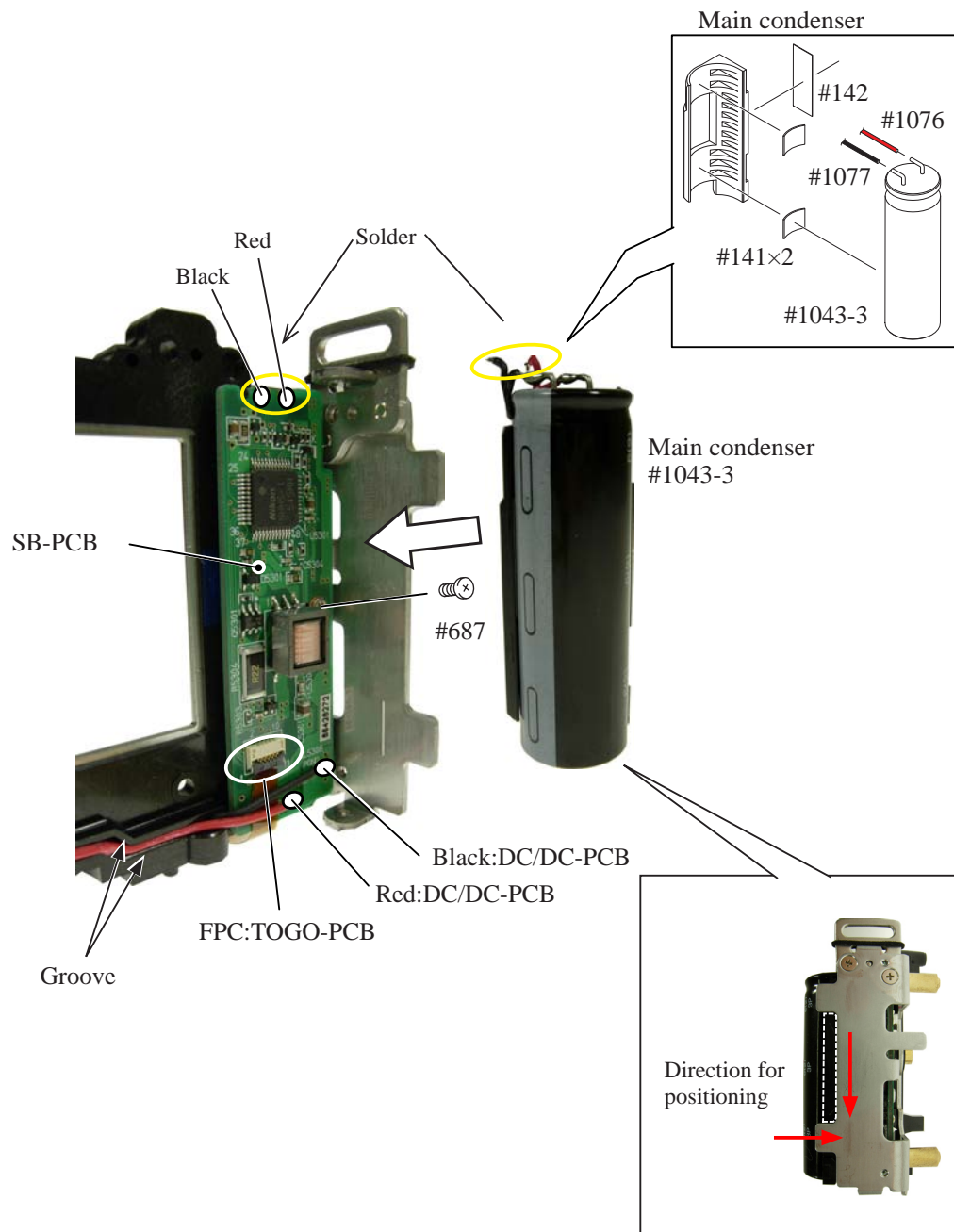
DC/DC lug plate
Eyelet ring unit
Other small parts

- Put the DC/DC lug plate (#159-1) at the final stage, then fix the battery box with the four screws (#615).



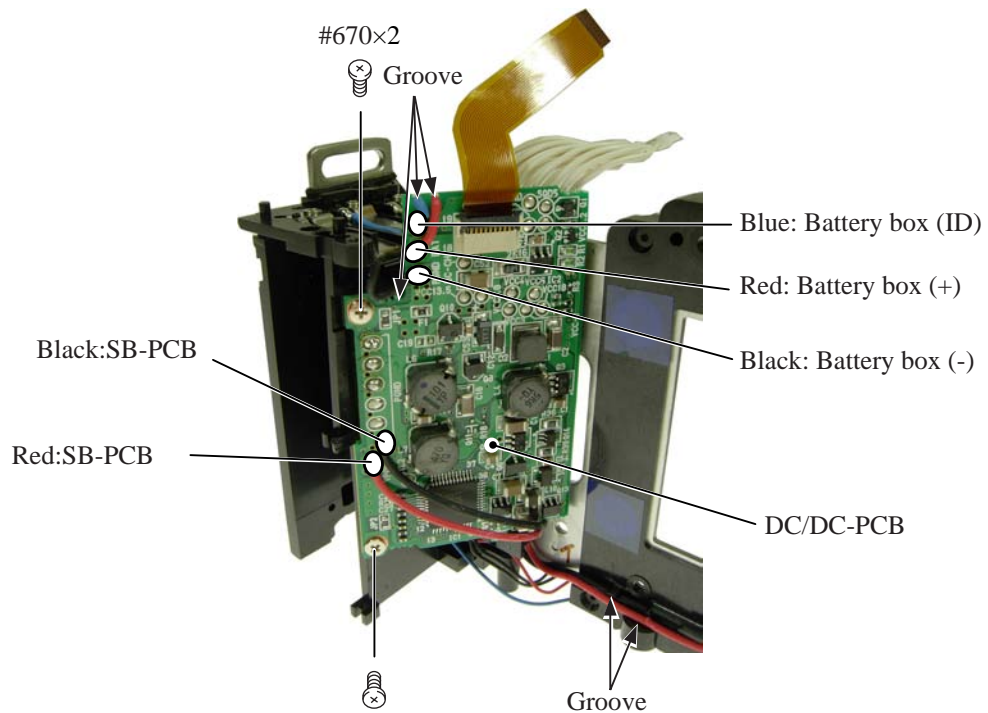
SB PCB

- Mount the SB-PCB, and fix it with the screw (#687).
- Solder the two wires (connected from DC/DC-PCB) and put them in the groove for arrangement.
- Adhere the main condenser with the adhesive double-coated tape by putting in the direction for positioning.
- Solder the two wires (yellow-circled) of the main condenser.



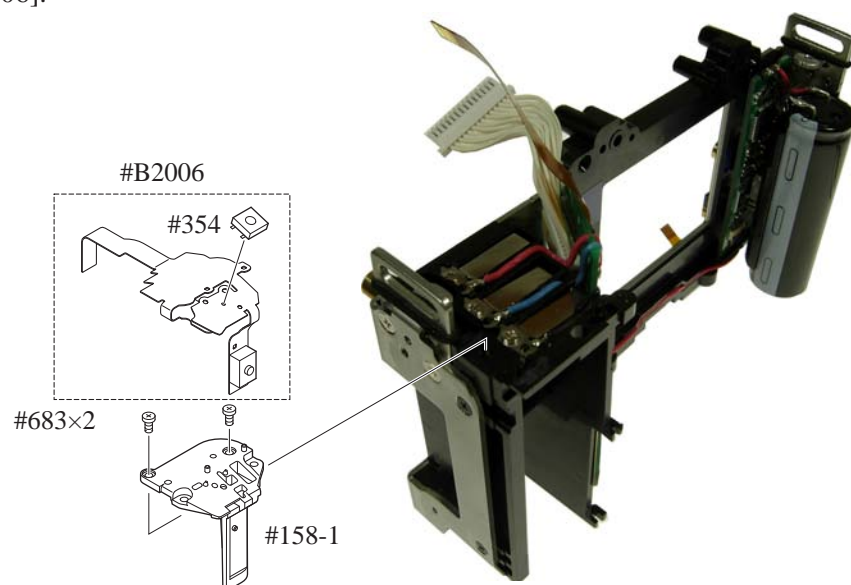
DC/DC PCB

- Mount the DC/DC-PCB, and fix it with two screws (#670).
- Put the wires in the groove for arrangement, and solder five wires (connected from SB-PCB and Battery box).



Remote block

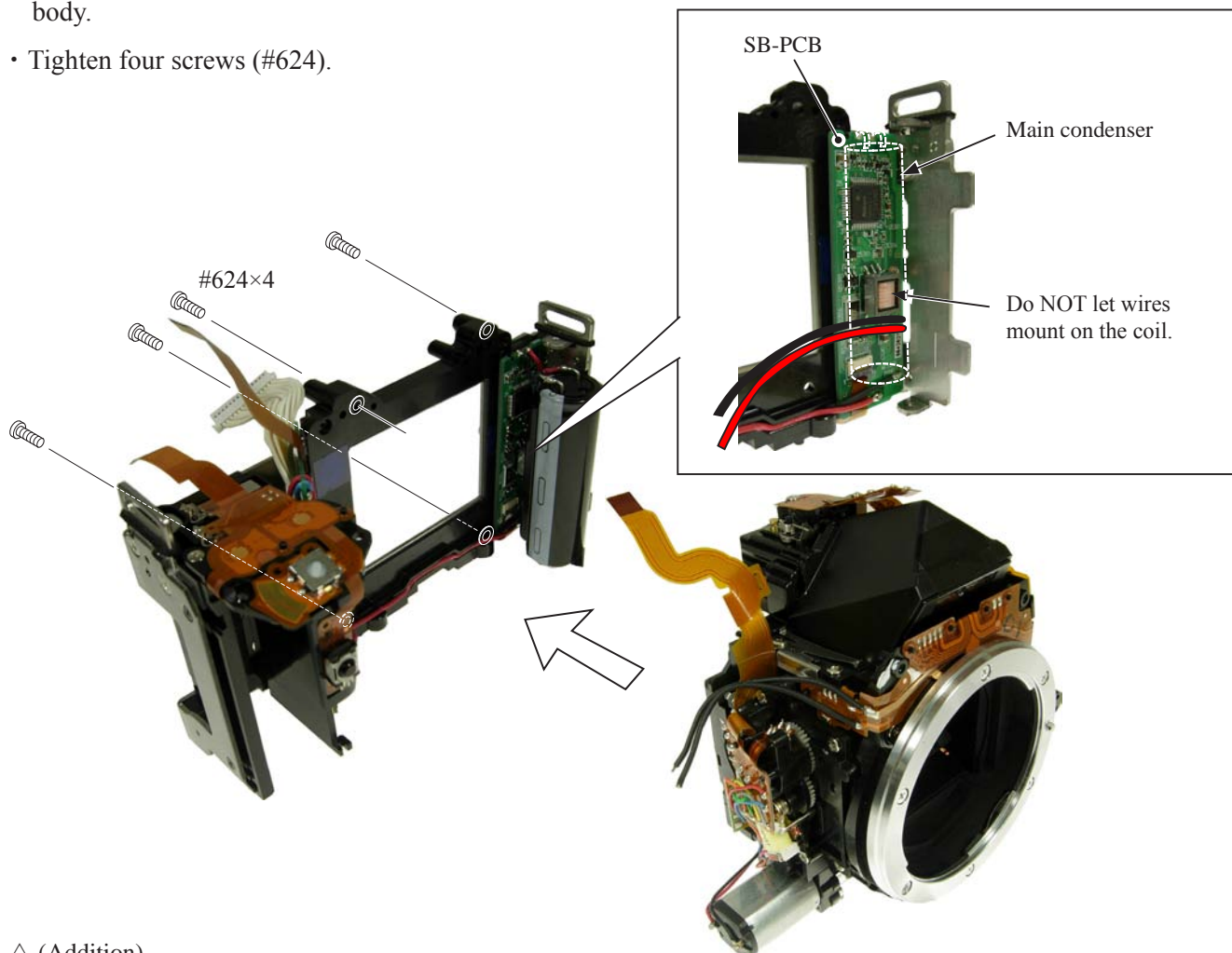
- Mount the remote block (#158-1), and fix it with two screws (#683).
- Attach SW-FPC [#B2006].



3. Mounting of Front body on Rear body

Mount the front body on the rear body

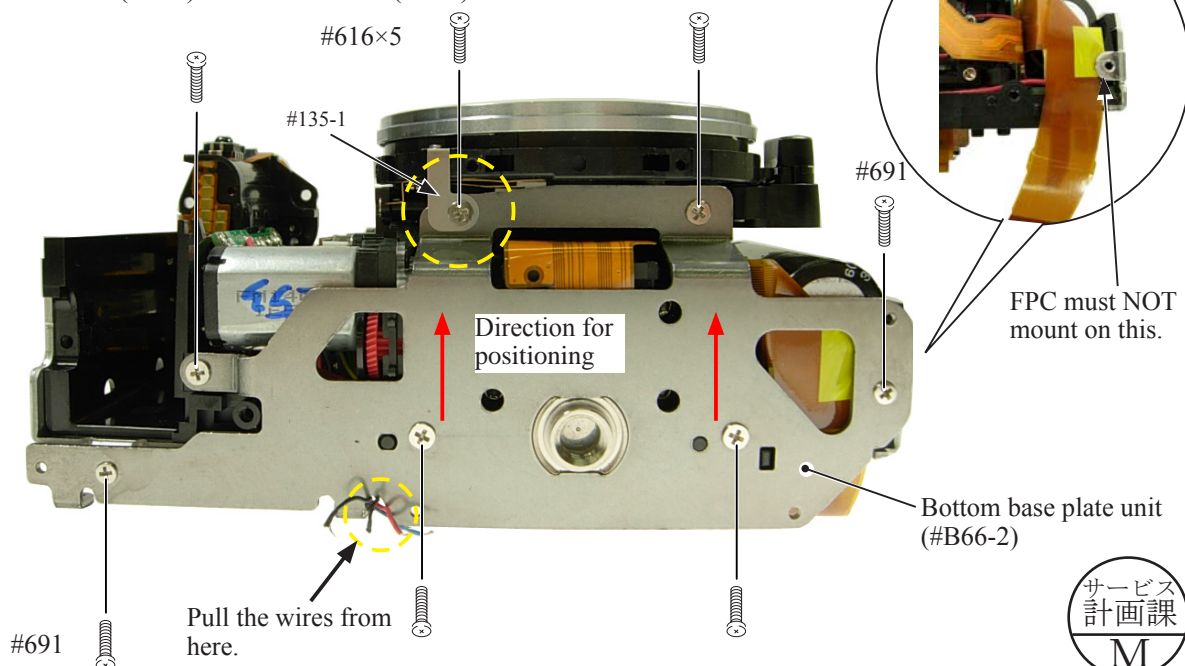
- Pass the wires of the relay-PCB through behind the main condenser, and assemble the front body into the rear body.
- Tighten four screws (#624).



△ (Addition)

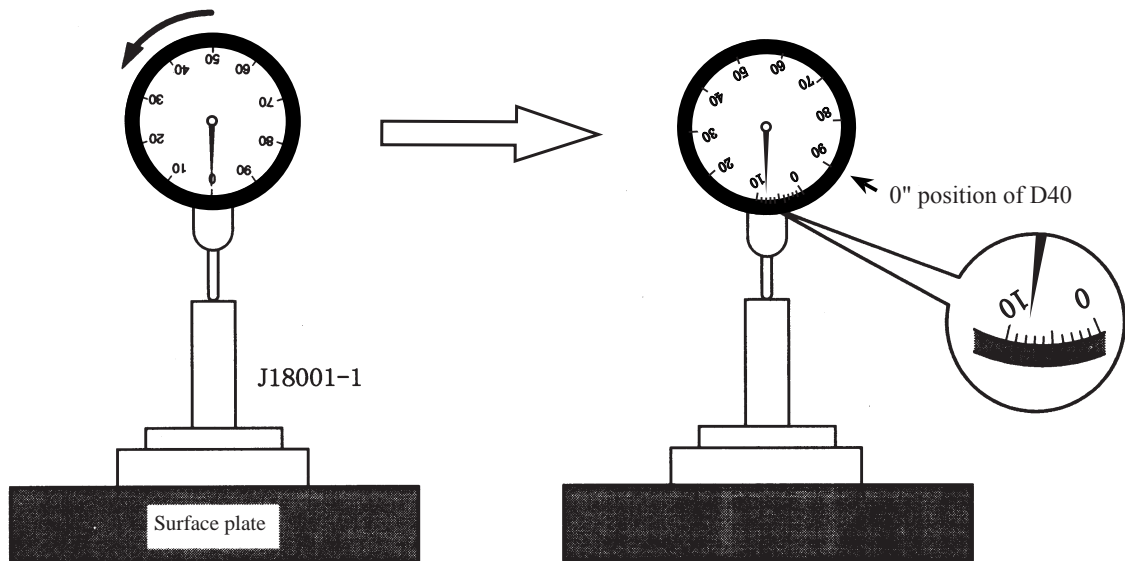
Bottom base plate unit

- Mount the bottom base plate unit (#B66-2) so that [#135-1] comes in front, and fix it with two screws (#691) and five screws (#616).



Inspection and Adjustment of Body back
--

* "0" positioning of the dial gauge



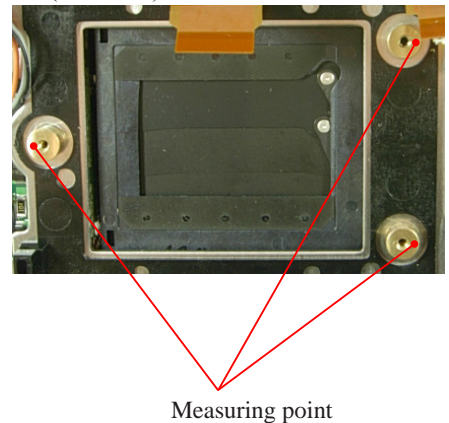
- ① Put the tool (J18001-1) on the surface plate, and set the dial gauge to "0".
- ② Turn the index ring in the direction of the arrow, and set to the scale "8" from "0" that was set in ① . (This is "0"-position of D40.)
- ③ Measure the body back based on "0" reference position of the index ring.

- Measure three parts from the bayonet face to the CCD-PCB attaching face.

Standard: $48.59 \pm 0.015\text{mm}$ / Parallelism: within 0.015mm

- In case it is out of standard, make an adjustment by loosening screws that attach the front and rear bodies, or by putting the washer(s) on the contact surface between the front body and rear body.

△ (Revision)



Note: For some bodies, washer(s) are already put on the attaching face of the CCD-bracket.

There are two cases as follows.

1. Purpose : To adjust the height of the camera body

There are indications by color marker on the CCD-PCB attaching face of the camera body side .

{Blue = 0.02mm (#87), Red = 0.01mm (#88), Green = 0.06mm (#89)}

* By adding the measured value to the thickness of washers, check if it is within the standard ($48.59 \pm 0.015\text{mm}$).

2. Purpose : To adjust the height of the CCD bracket

There are indications by marker on the CCD-bracket attaching face

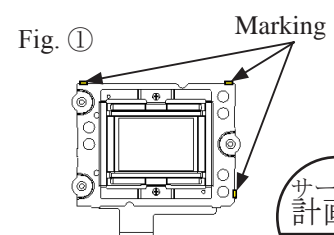
One marking = Put three washers [#88(0.02mm)] at three places

Two markings = Put three washers [#87(0.1mm)] at three places

* When the CCD PCB is replaced, remove the washers.

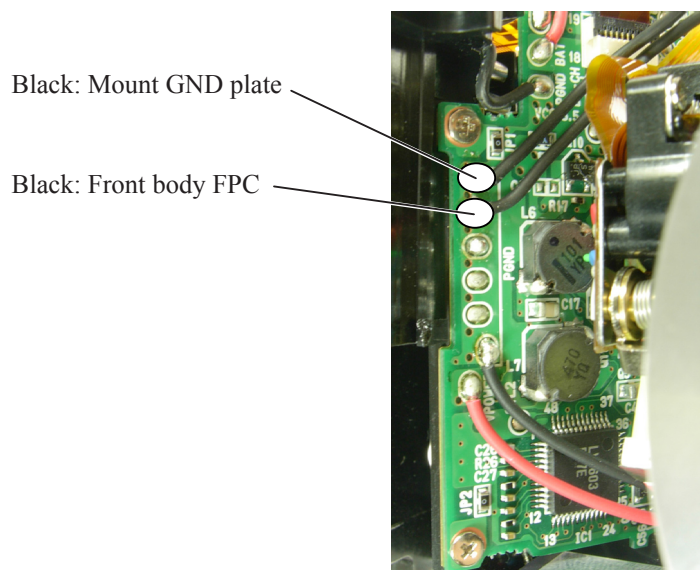
△ (Addition) 3. Any marking(s) of the three in the right "Fig. ①" =

Put the tracing-film sheet (#84) in the marked place(s).



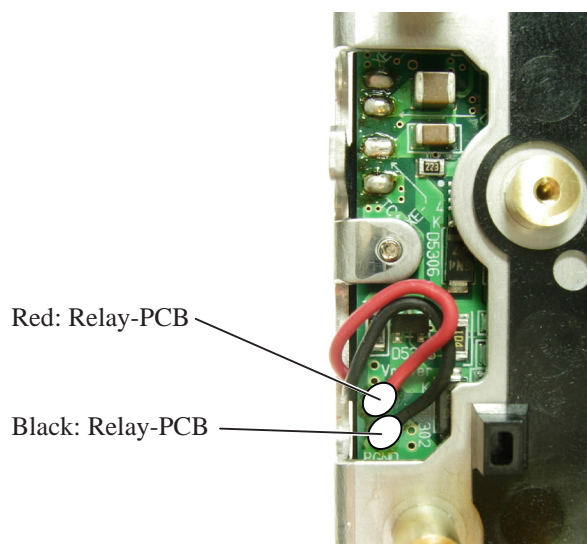
DC/DC PCB

- Solder the two wires (connected from Mount GND plate and Front body FPC).



SB PCB

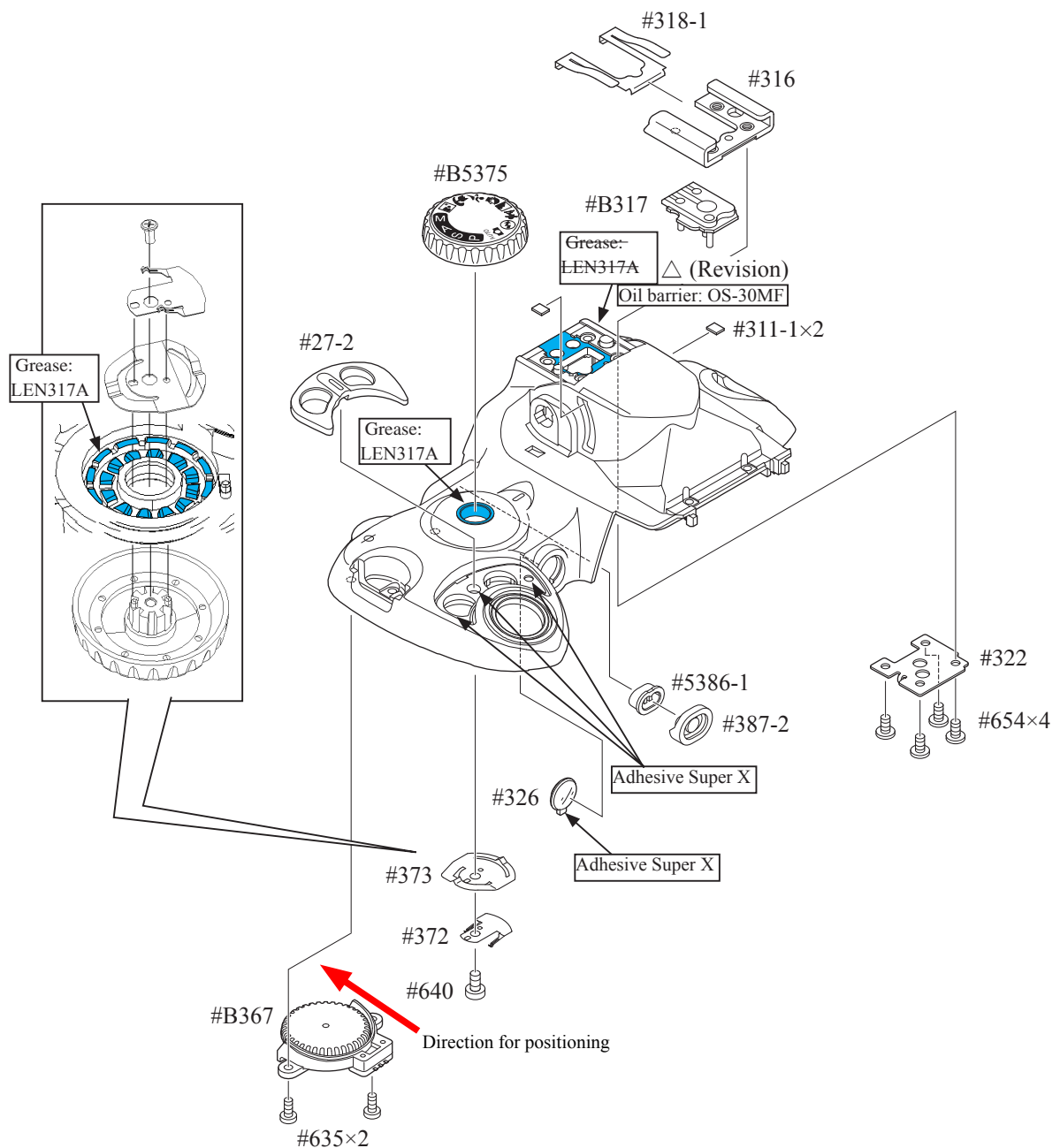
- Solder the two wires (connected from Relay-PCB).



Assembly of Top cover

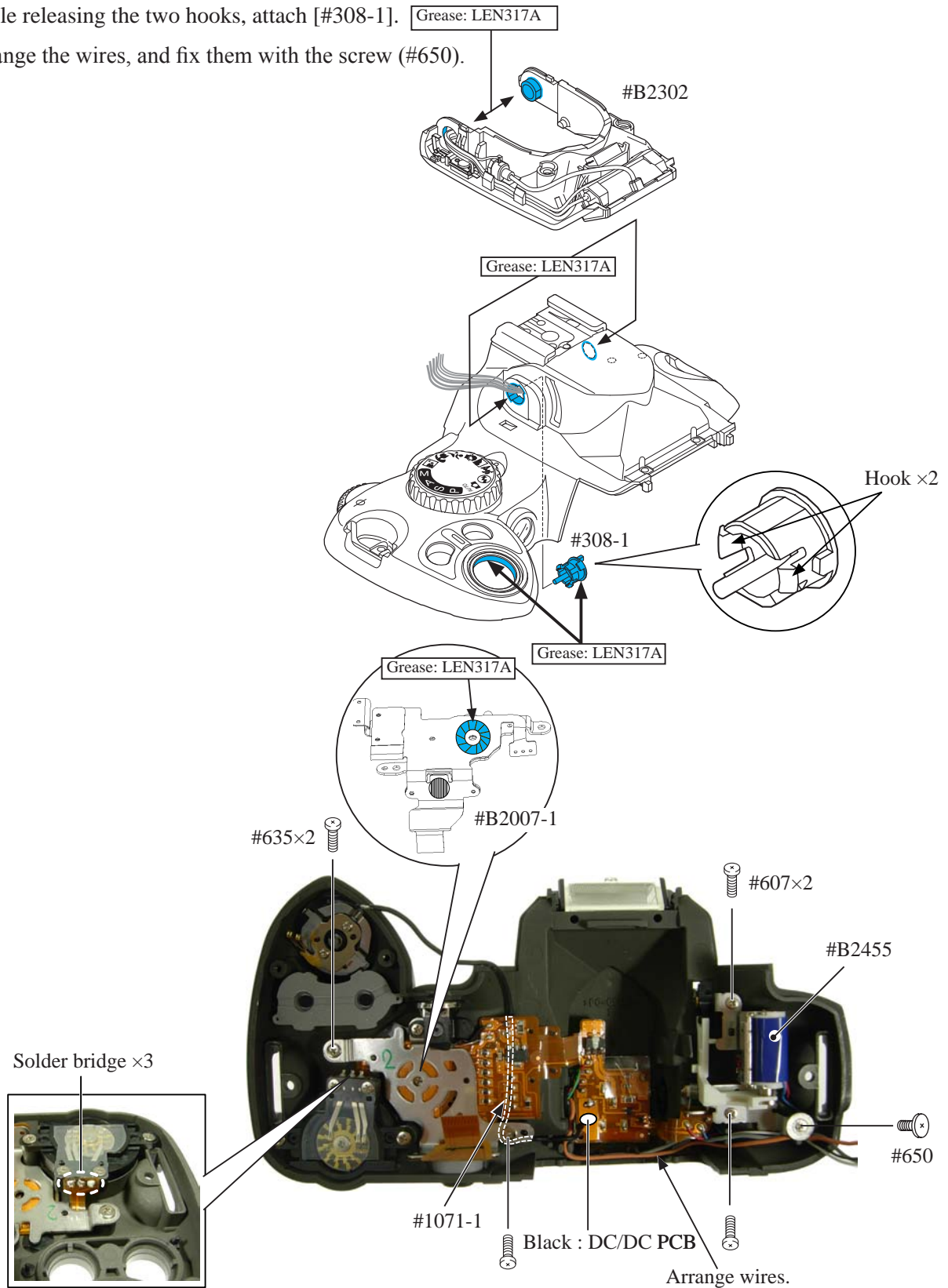
Top cover FPC unit / other small parts

- Fix [#322], [#B317], shoe base (#316), and [#318-1] with four screws (#654).
- Fix the mode dial unit (#B5375), [#373], and [#372] with the screw (#640).
- Fix the C/D unit (#B367) with two screws (#635).
- Attach [#387-2] and AF/AE lock button (#5386-1).

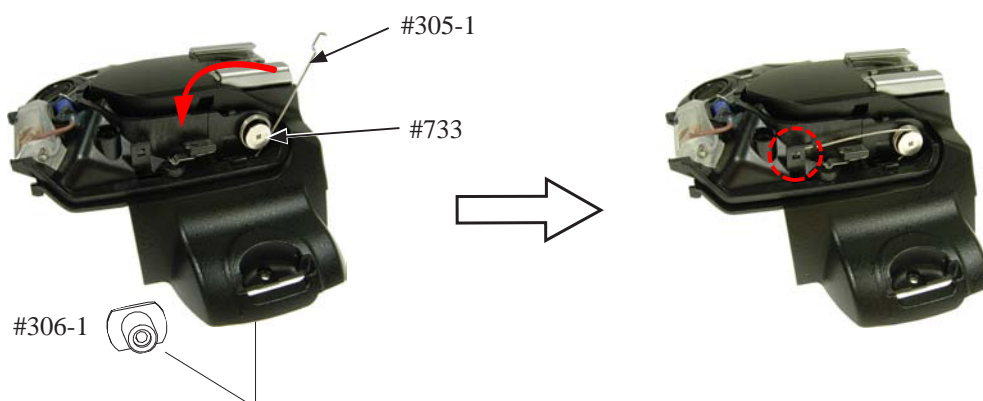


SB lower case unit / SB release base unit / Buttons

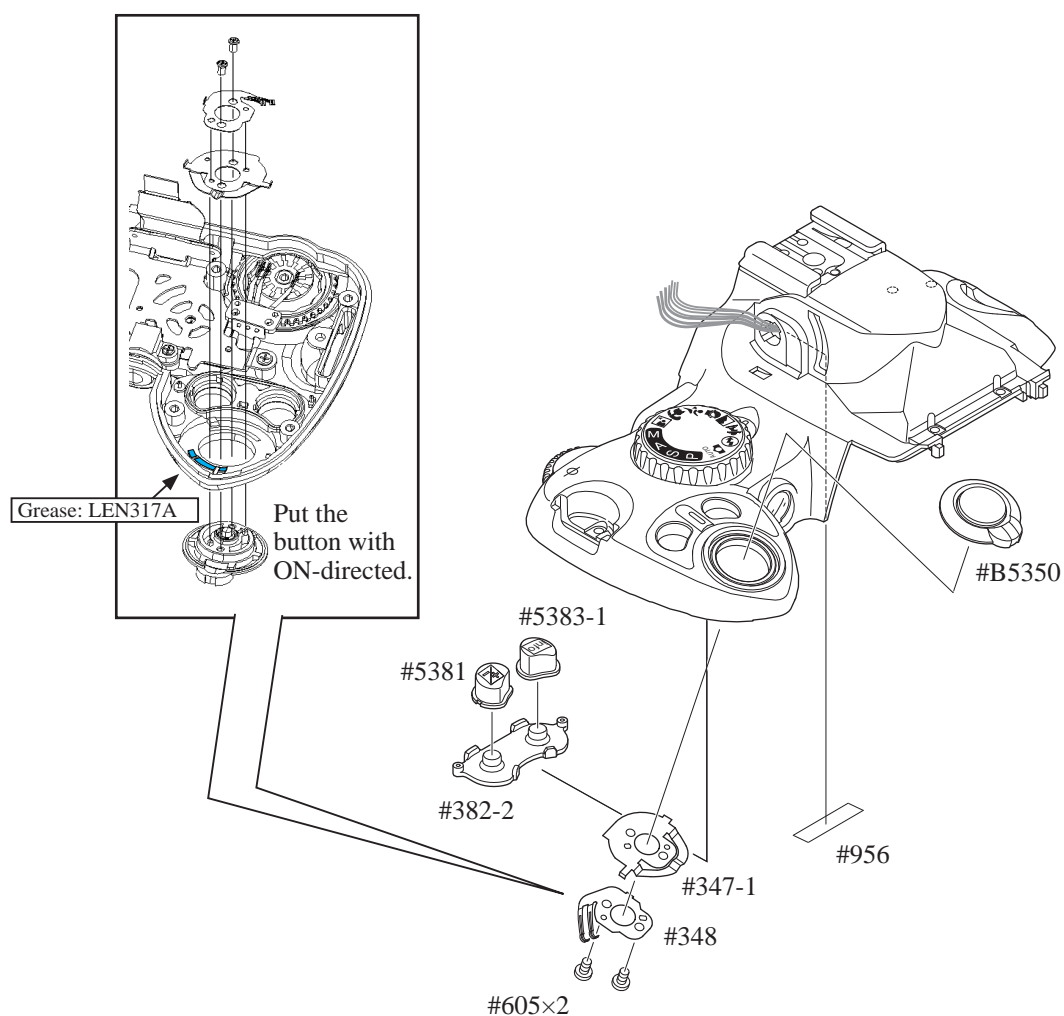
- Mount the SB lower case unit (#B2302).
- Arrange the wire (#1070-1) as shown below.
- Mount the top cover FPC unit (#B2007-1), and fix it with two screws (#635).
- Make three solder bridges.
- Mount the SB release base unit (#B2455), and fix it with two screws (#607).
- While releasing the two hooks, attach [#308-1]. Grease: LEN317A
- Arrange the wires, and fix them with the screw (#650).



- While pressing the SB case rotating shaft (#306-1), attach the SB-up spring (#305-1) by pushing it in the direction of the arrow, then fix it with the screw (#733).

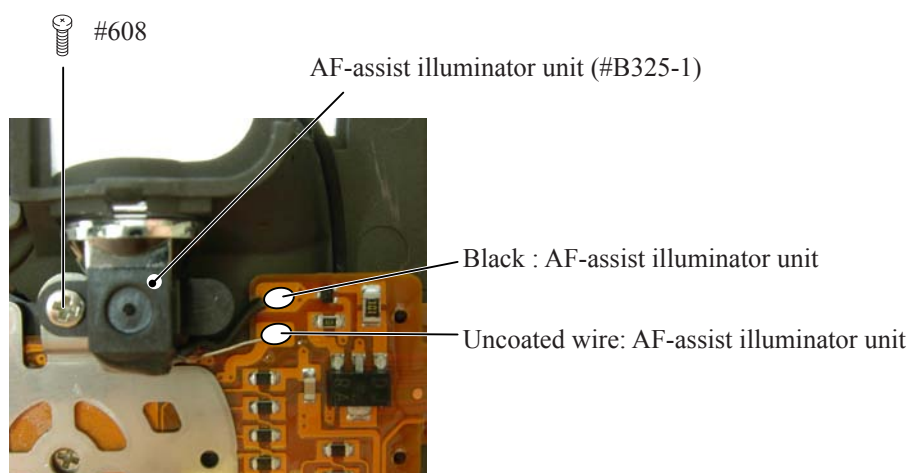


- Mount the release button unit (#B5350), [347-1], and [348], and fix them with two screws (#605).
- Attach the INFO button (#5383-1), \pm aperture button (#5381), and rubber SW (#382-2).



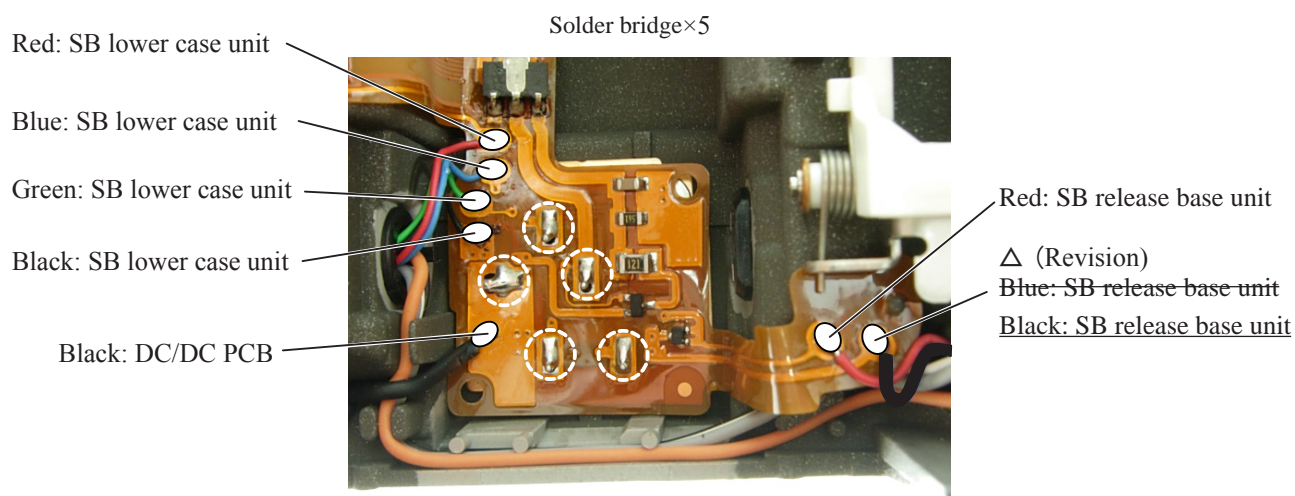
AF-assist illuminator unit

- Mount the AF-assist illuminator unit (#B325-1), and fix it with the screw (#608).
- Solder the two wires (connected from AF-assist illuminator unit).



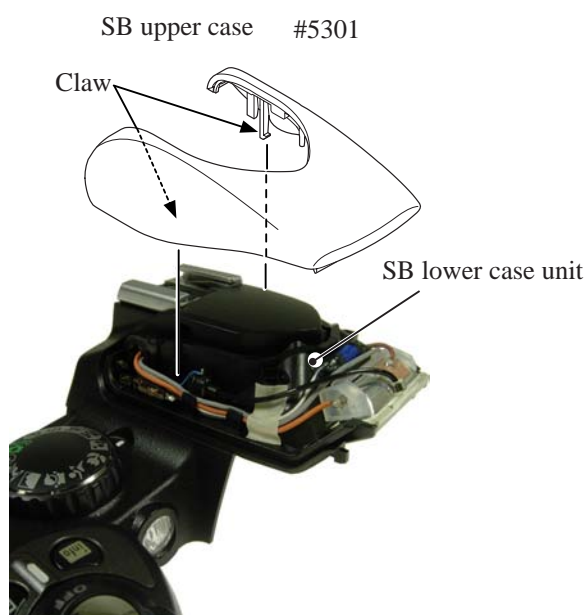
Top cover FPC / Wiring

- Make five solder bridges.
- Solder the seven wires (connected from SB lower case unit, DC/DC PCB and SB release base unit).

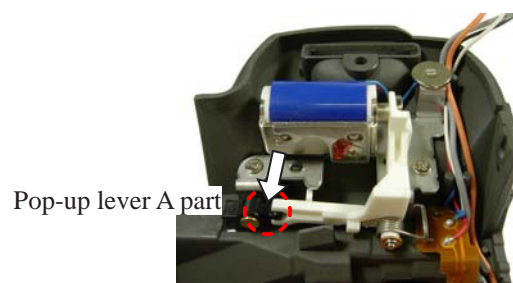


SB upper case

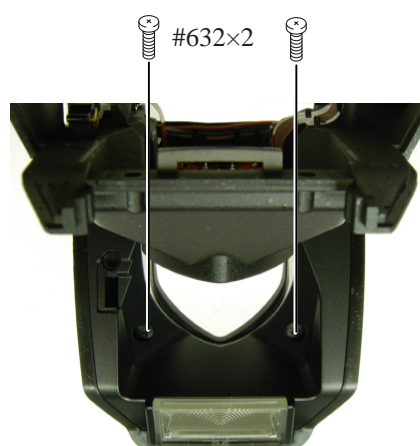
- Mount the SB upper case (#5301) on the SB lower case unit.



- Press the pop-up lever A part of the top cover unit, and raise the built-in SB.



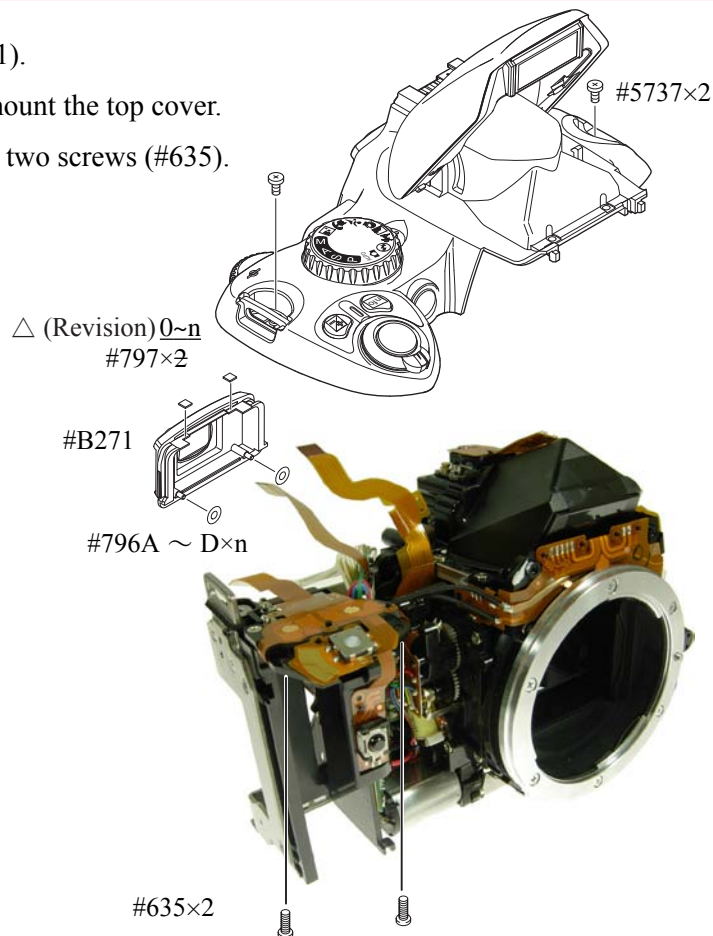
- Tighten two screws (#632).



When the AE-CCD positioning is adjusted, solder the only four wires that connected from the top cover to SB-PCB. Then, make a temporary assembly without mounting the rubber eyecap (#B271), and assemble up to Page A25.

Top cover

- Mount the rubber eyecap (#B271).
- Watching the wires and FPCs, mount the top cover.
- Tighten two screws (#5737) and two screws (#635).



DC/DC PCB unit

- Solder the wire (connected from Top cover).

Black: Top cover



SB PCB

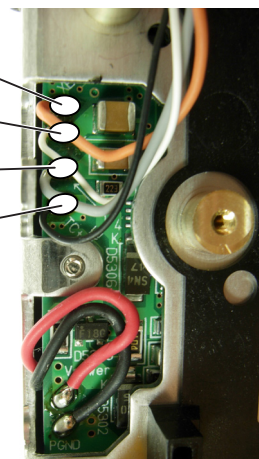
- Solder the four wires (connected from Top cover).

Orange: Top cover

White: Top cover

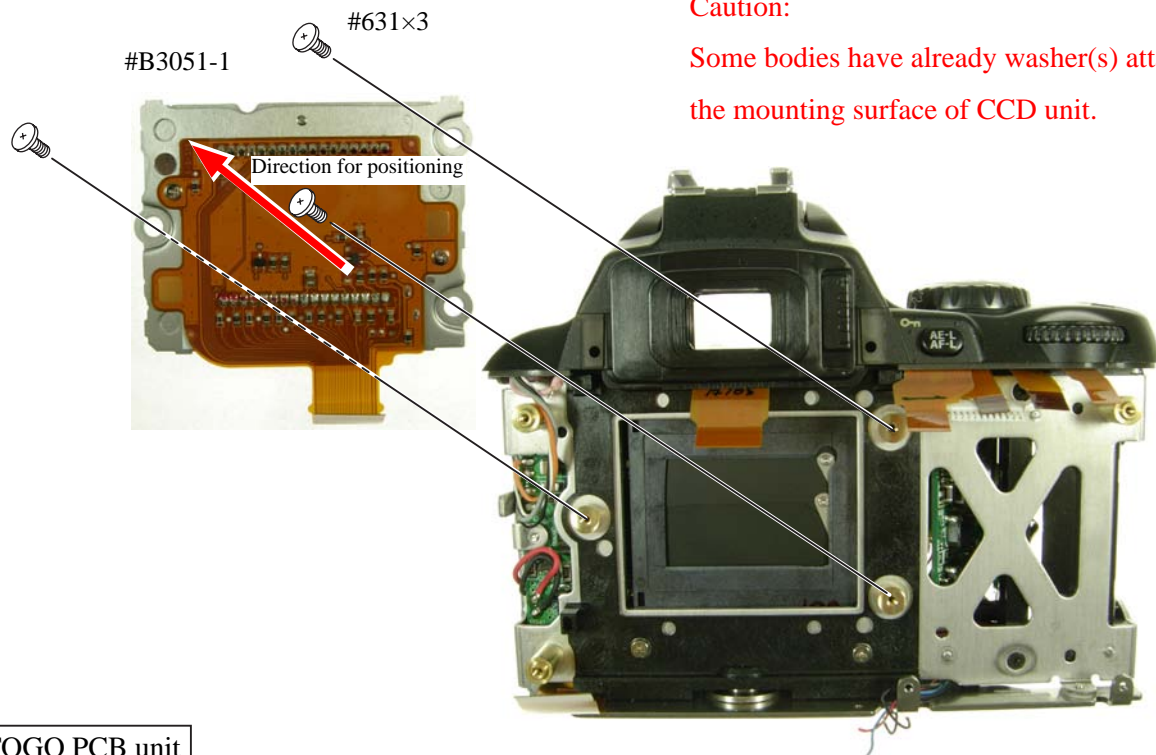
Gray: Top cover

Black: Top cover



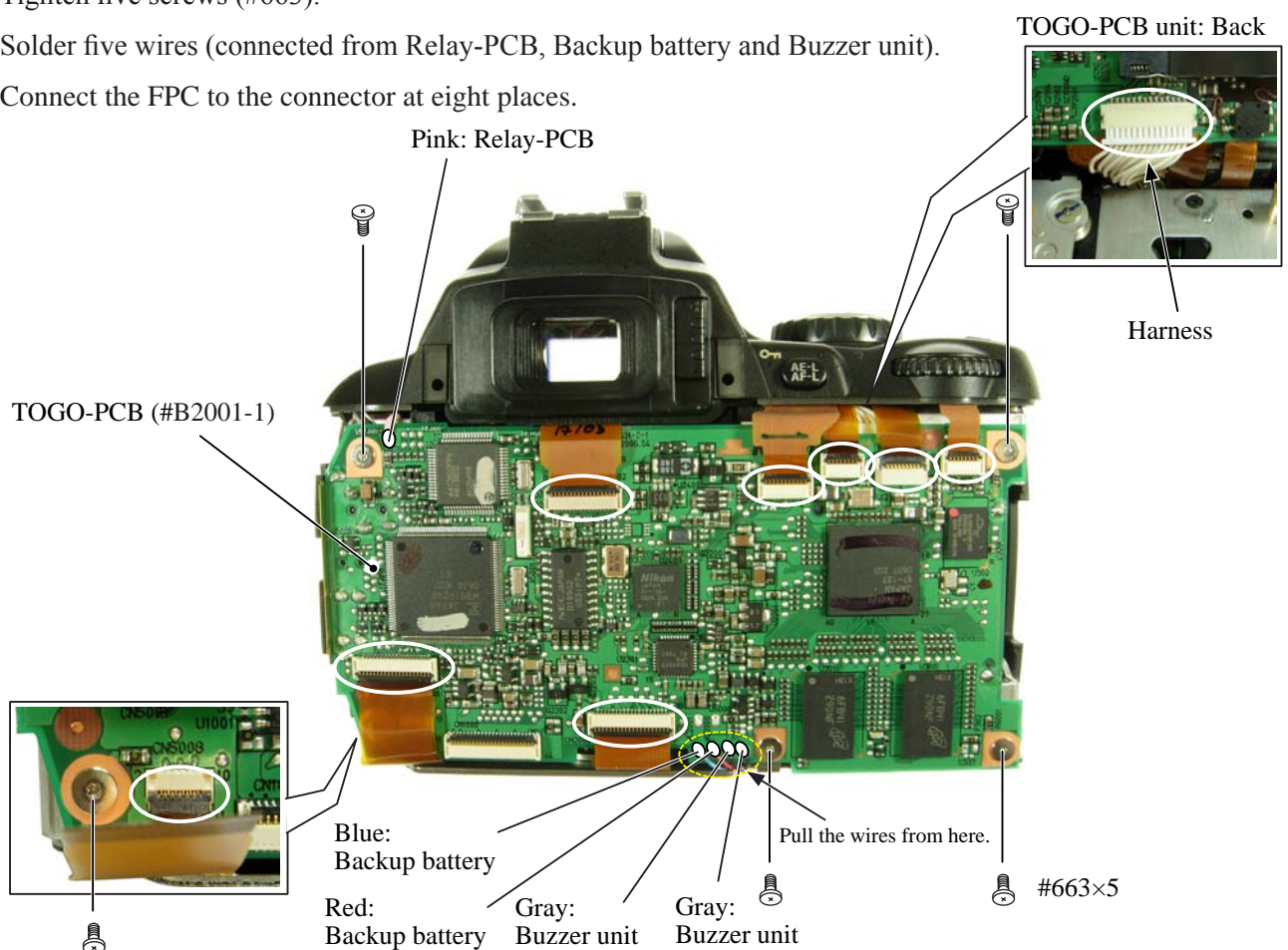
CCD unit

- Mount the CCD unit (#B3051-1) by following the direction for positioning, and fix it with three screws (#631).





TOGO PCB unit

- Connect the harness.
- Watching the wires and FPCs, mount the TOGO-PCB (#B2001-1).
- Tighten five screws (#663).
- Solder five wires (connected from Relay-PCB, Backup battery and Buzzer unit).
- Connect the FPC to the connector at eight places.



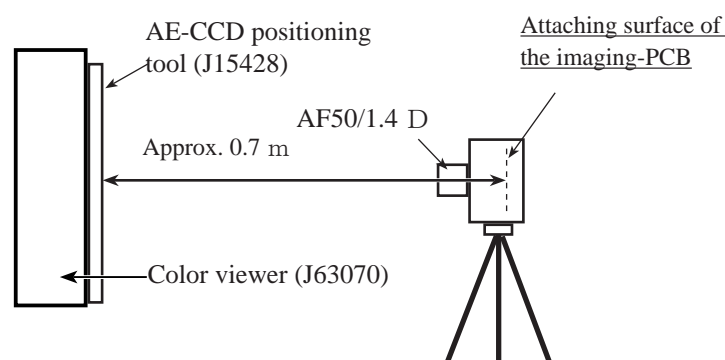
Adjustment of AE CCD positioning

 WARNING	
	<ul style="list-style-type: none"> ● Take extra care not to get an electric shock when detaching covers. ● After removing covers, be sure to discharge the main condenser according to the instructions of repair manuals.

- * Under the environment where the AE-CCD positioning is adjusted, use the reference body (and change the environment depending on measured results).
- In case the measured value is out of standard, check if there is no misalignment of the focus areas.
 - In case the measured value is out of standard, change the environment of measurements. (e.g. setting place/direction, room brightness, etc)

Procedure

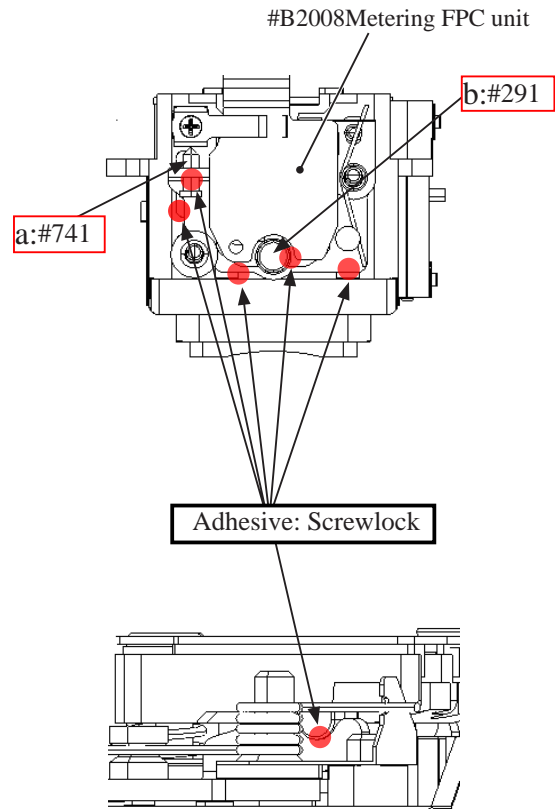
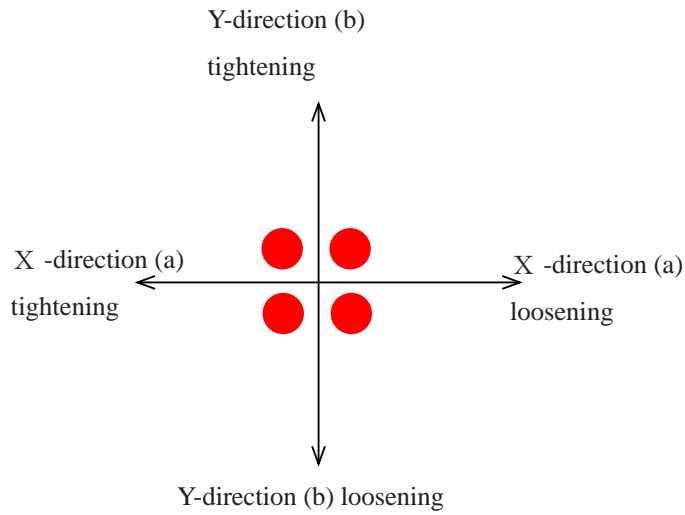
- ① Only solder the four wires (connected from the top cover) on the SB-PCB. Assemble temporarily without attaching the screws (for fixing the top cover) and mounting the rubber eyecap (#B271), then make a temporary assembly of the front cover unit (#B5024) and rear cover with four screws (#5690).
- ② Mount "AF50/1.4D" on the camera, and fix them on the tripod horizontally.
- ③ Connect the camera and PC via USB cable (UC-E4).
- ④ Provide power by the battery tool (J61219).
 - * Be careful NOT to cause a short-circuit at uncovered portions.
- ⑤ Attach the AE-CCD positioning tool (J15428) in the color viewer (J63070), and turn power ON.
- ⑥ Keep the 0.7-m distance between the front face of the AE-CCD positioning tool and the reference surface of the camera. Set the camera AF to manual, and the focus ring to "0.7 m" by rotating it.
- ⑦ Start up the inspection and adjustment software for D40 (J18416), and select "Inspection and Adjustment for AE CCD POSITION" then "Set Camera for AE CCD POSITION".
Looking through the viewfinder, move the camera so that the focus areas of the camera coincide with the circular holes of the AE-CCD positioning tool.
- * Set the camera and AE-CCD positioning tool horizontally.
- ⑧ Select "Inspection and Adjustment for AE CCD POSITION".
 - * Cover the camera with a black cloth, etc, when measured.
- ⑨ Attach the metering FPC unit without tightening three screws (#291). Then give each screw two and half turns counterclockwise. By following instructions on PC, make the position adjustment of AE-CCD by the screws (a:#741, b:#291).
- ⑩ Fix the two screws with screwlock.
- ⑪ Fix the four locations of the AE CCD sensor-base with screwlock. (ref. Page A27 for the adhering positions.)



Standard → Reference screw

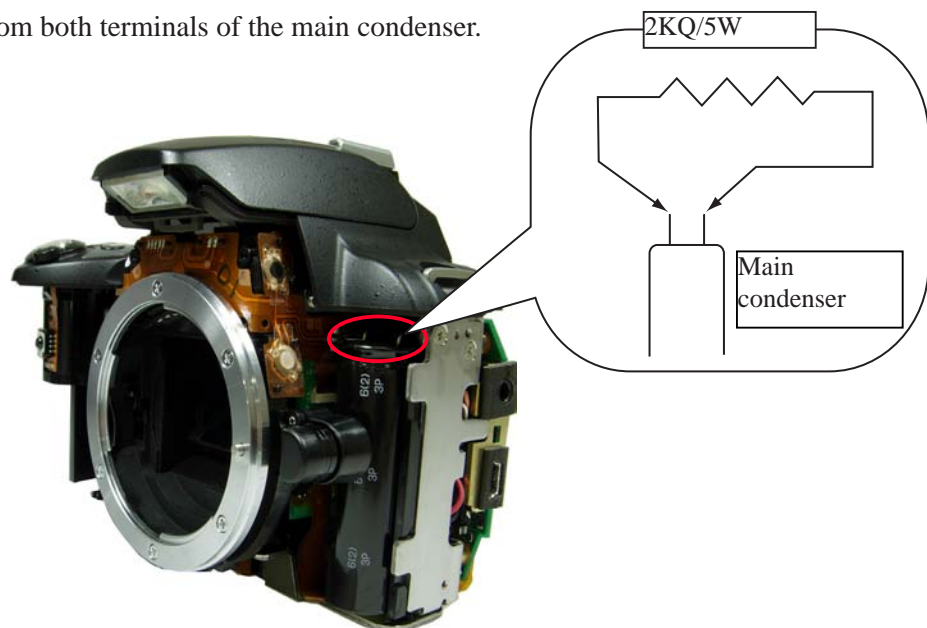
X-direction → a: Screw

Y-direction → b: Screw



Discharge of Main condenser

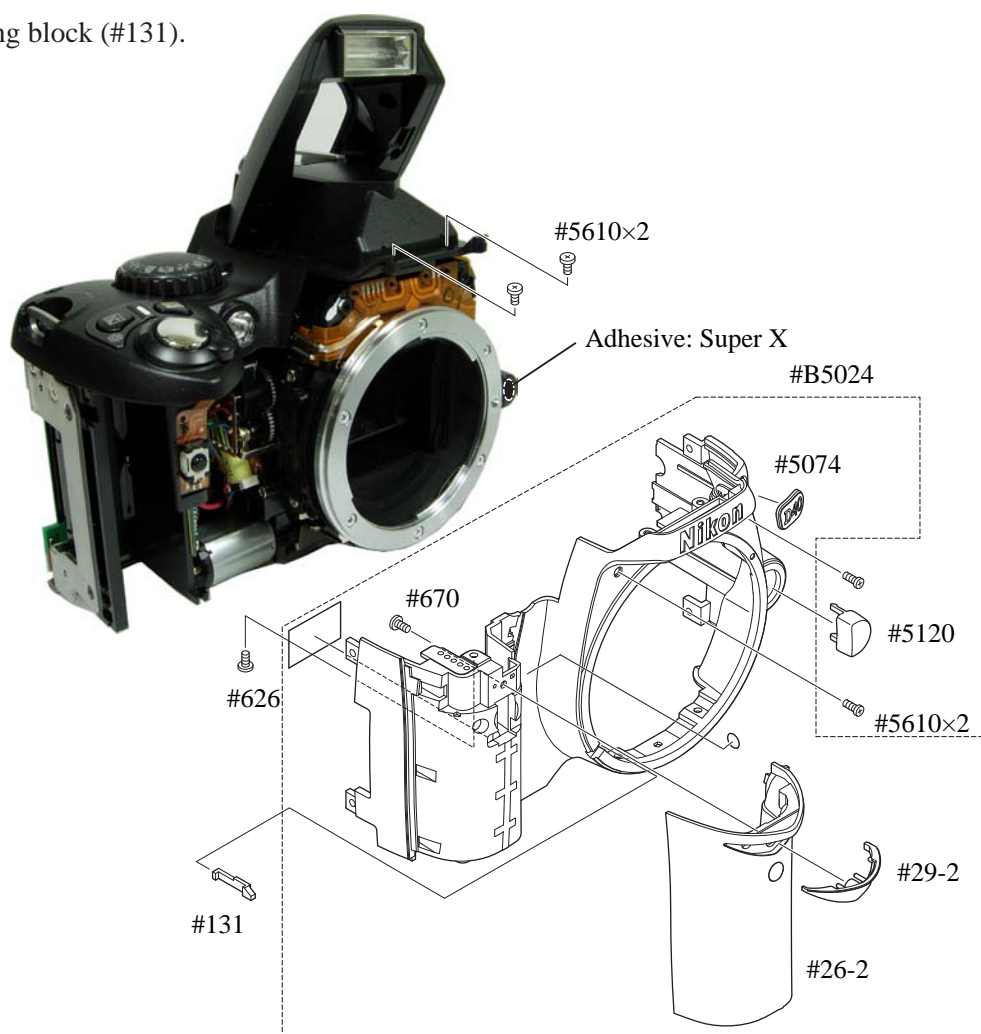
- Discharge currents from both terminals of the main condenser.



- ⑫ After completing the adjustment, remove the temporarily-assembled rear cover and front cover. Then mount the rubber eyepiece (#B271) and fix the top cover with two screws (#5737) and two screws (#635).

Covers

- Assemble the front cover unit (#B5024) together with the Fmin coupling block (#131).



Gap adjustment of SB lighting unit

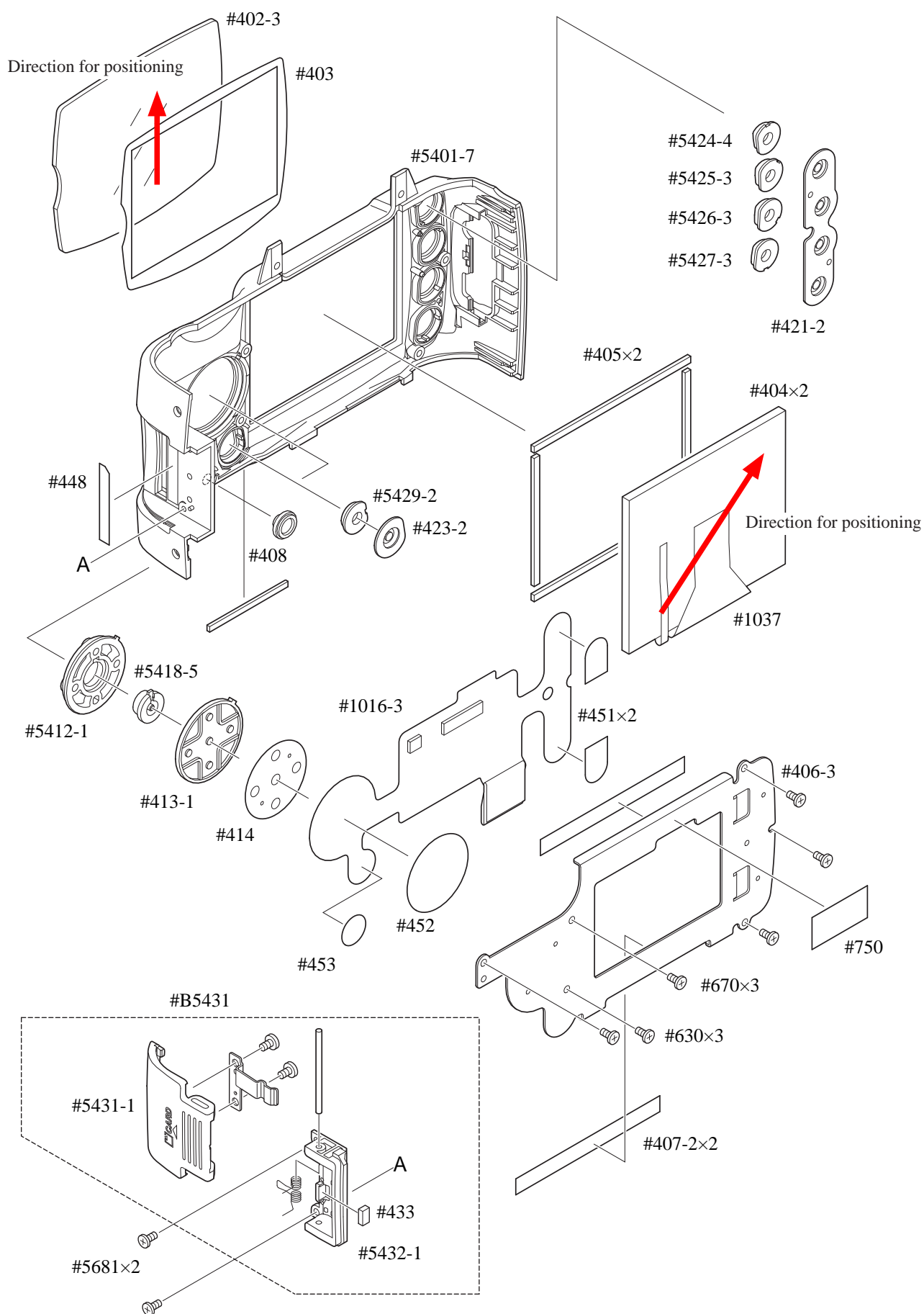
- In case the result is out of standard, pop the SB unit up and make an adjustment by turning the adjusting dial with Hexagonal wrench.

Standard: 0.14 ~ 0.5mm



Adjusting dial

Rear cover



Rear cover (continued)

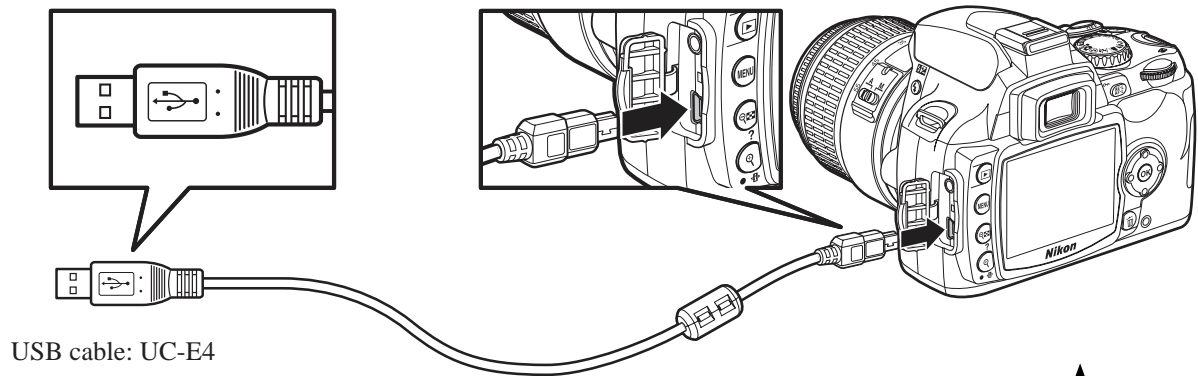
- Connect the TFT-PCB connection-FPC to the connector.
- Mount the rear cover.
- Tighten four screws (#5690) and two screws (#5618).



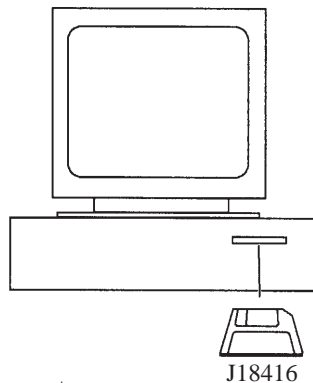
Accuracy inspection and adjustment (Camera body)

(except Image unit)

★ : New tool

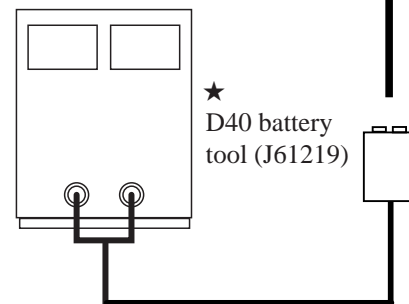


To USB terminal



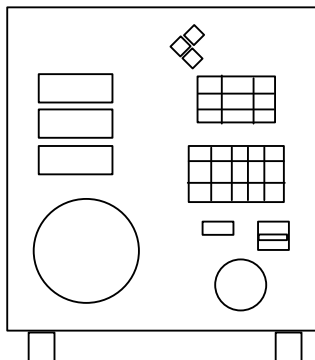
★ D40 adjustment FD: IBM 3.5

Stabilized power source (Set value = 7.4V
0.3Ω 5.0A)
+ D40 battery tool (J61219) or
AC adapter (EH-5)
+ Power connector (EP-5)

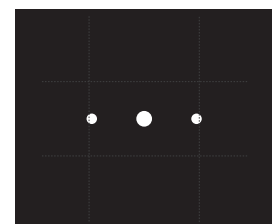


Caution: When performing "Adjustment for BATTERY CHECK LEVEL" use the D40 battery tool (J61219).

Shutter tester (EF-1) (J19123)



Flash meter



AE-CCD positioning tool (J15428)

Set up in front of color viewer (J63070)



J18267



AF28/2.8D

Caution:

When the inspection and adjustment are made with the shutter tester, turn the tester ON to light a lamp, and carry out the aging for 3-5 minutes.

D40 Inspection and Adjustment Software (J18416)

This inspection and adjustment software runs on Windows.

Install the software by following the below procedure.

<Operating environment>

Check the following operating environment which is required for installing this program on PC.

PC	IBM PC/AT compatible
OS	Windows XP Professional Edition, Windows XP Home Edition, Windows2000,
CPU	Pentium II 300MHz ~
RAM (memory)	256 MB or more
HD	6MB-or-more free disk space is required when installing
Monitor resolution	1024 × 768 pixels or more
Interface	※ USB interface (V1.1, 2.0)

As long as the above hardware requirements are met, any PC such as desktop or laptop, etc is available.

< Cautions in starting program >

When starting this program, close all the other applications.

If some other applications are running, this program may not be activated.

< File >

D40.exe	Application execution file
NkdPTP.dll	Library file: USB communication application extension file for Windows XP
NkdPTPDi.dll	Library file: USB communication application extension file for Windows 2000
PTPC	Driver file storing folder for PTP: for Windows 2000

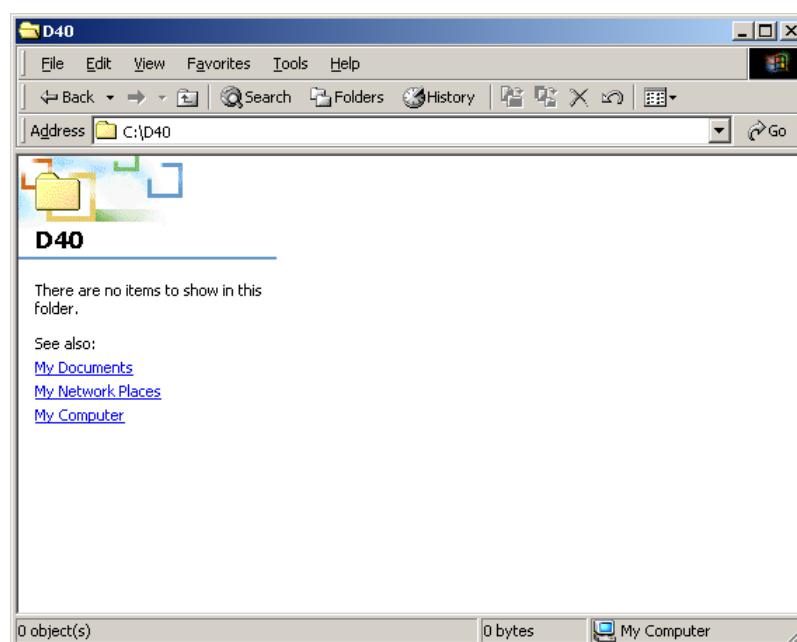
<Procedure for installation>

The file (PD40.EXE) of this program is provided via FD or e-mail.

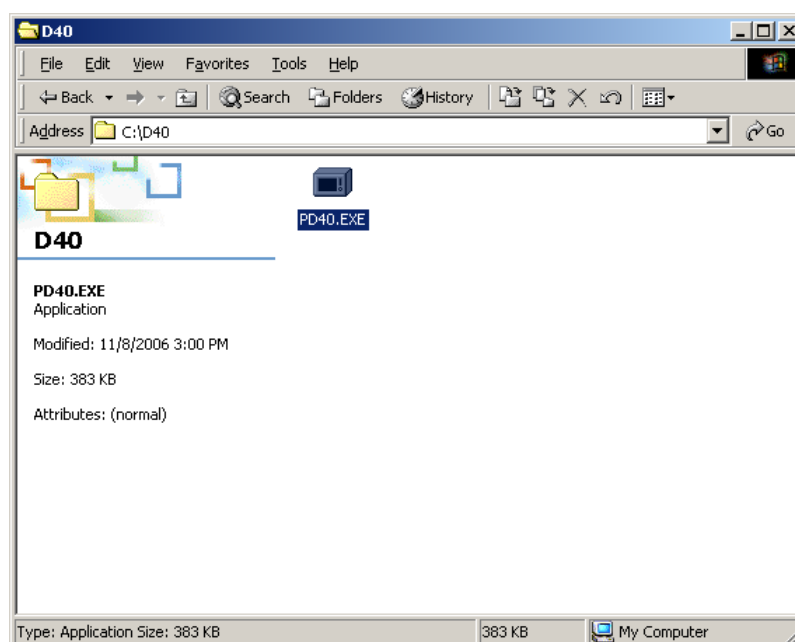
Because this is the self-extracting file, decompress the file before installing, and follow the next procedure.

1. Create a folder for install under any name in any drive.

(e.g.) C: ¥ D40

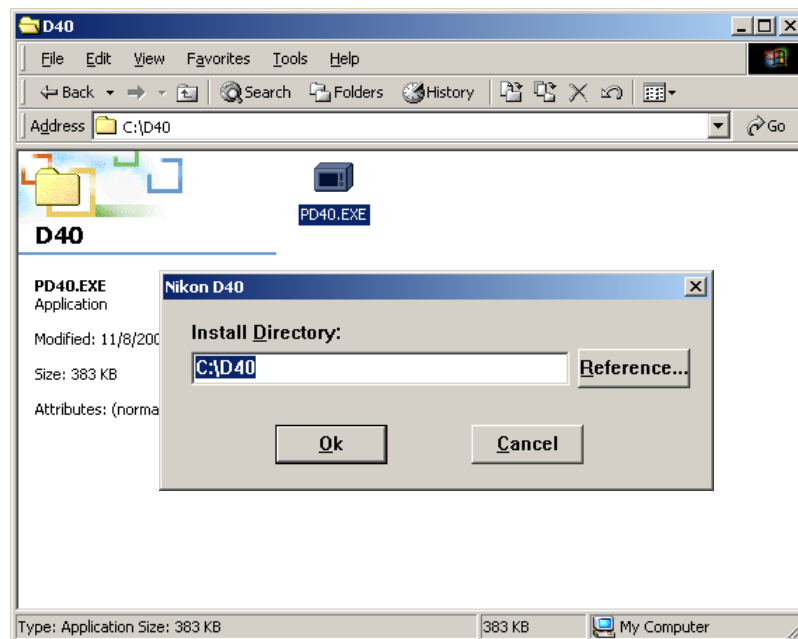


2. Paste the file (PD40.EXE) in the created folder.

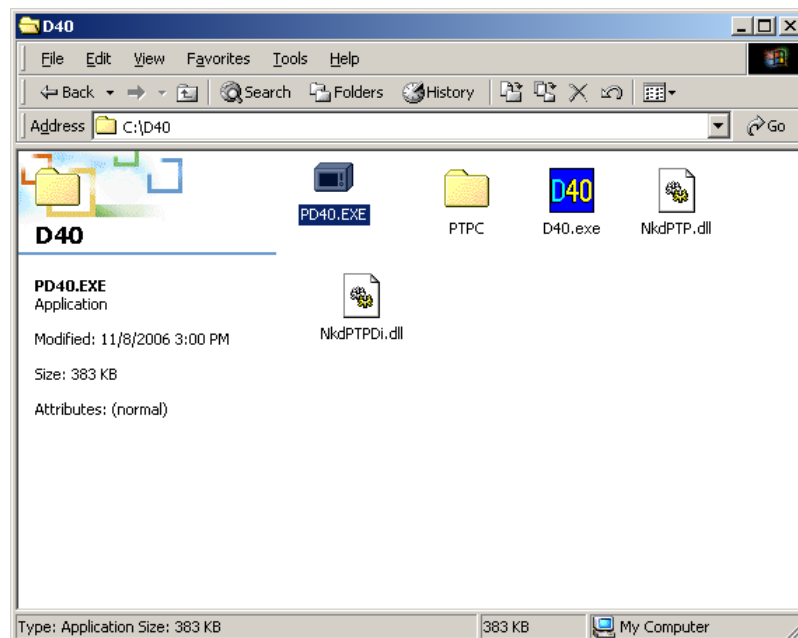


3. Double-click on the pasted file to display the following screen.

Press the OK button, then decompression starts.



4. When the decompression of file is finished, the file (D40.exe) is created.



5. The install is completed.

< Procedure for installing USB driver >

If this program is used by the USB interface, installing the USB driver is necessary.

But if the OS is "Windows XP", the driver is already preloaded so it is not necessary to install it.

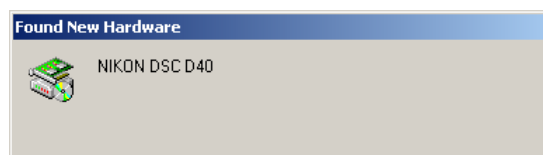
1. Set the USB of camera to "PTP".

(SETUP menu → USB setting → PTP)

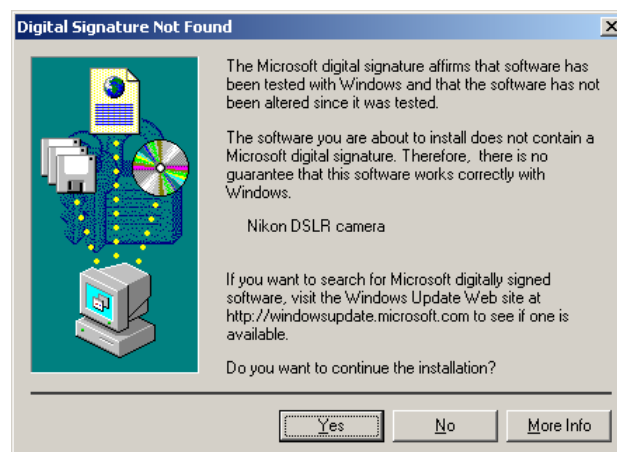
2. Connect the camera and PC by USB cable.

Turn camera ON.

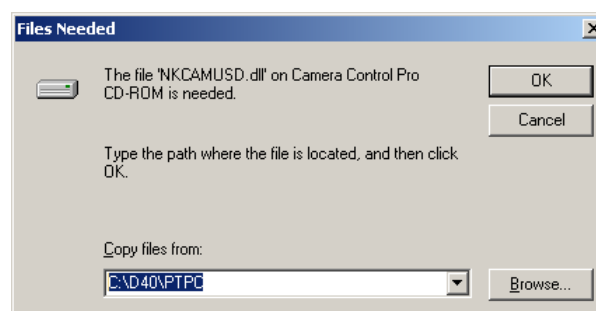
3. When "Add New Hardware Wizard" is displayed, click "Next".



4. Click "Yes".



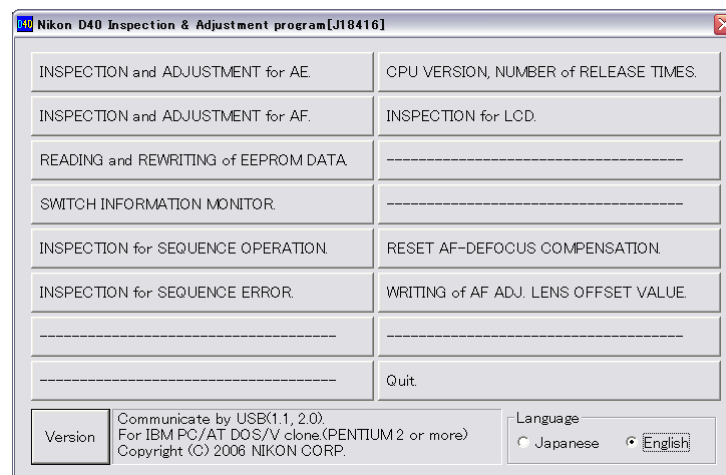
5. Click "Reference". Select "C:\D40\PTPC" of C drive, and click "OK".



6. Reboot the PC and the install is completed.

<Start-up of Program>

1. Double-click the file (D40.exe), then Inspection and adjustment program for D40 starts.



2. To display in Japanese, select the radio button "JAPANESE" in "LANGUAGE" in the lower right-hand corner of the screen.

However, this is not properly viewed in the English OS.



3. When the "Version" button at the lower-left is pressed, the program version will be displayed.
4. Select each item button according to operation.
Follow the instructions on the next screen that will be shown after pressing the item button.
5. To finish the program, press the "Close (×)" button in the right-hand corner of the screen or "QUIT".

AE inspection and adjustment

《USB connection communication》

- ① AE CCD alignment inspection and adjustment (ref. Page A26, A27 for details)
- ② AE accuracy inspection and adjustment
- ③ Aperture accuracy inspection
- ④ Adjustment for battery check level [Use the D40 battery tool (J61219) and stabilized power supply.]
- ⑤ Built-in SB flash inspection and adjustment

[Tools required] ref. Page A31.

• AE accuracy inspection and adjustment

When AE accuracy inspection and adjustment is made,
Two types of lenses (AF50/1.4D and AF28/2.8D) are used.

Caution:

AE accuracy is not inspected in the traditional manner that uses the exposure value of the shutter tester. The metering value is displayed on PC screen.

• Battery cneck voltage level adjustment

Connect the D40 battery tool (J61219) to the camera, and turn the communication change-SW to ON. Then make adjustment.

• Built-in SB flash inspection and adjustment

Set the distance between camera and flash meter to 1 m, and inspect and adjust the light volume of the built-in SB. (ref. adjustment software for details)

AF inspection and adjustment

Note: When using the adjustment software for the first time, prepare three cameras of D40 and measure by "WRITING of AF ADJ. LENS OFFSET VALUE" on the main menu.

<< USB connected communication >>

- ① AF accuracy adjustment (Make the overall following adjustment.)
- ② YAW, PITCH inspection and adjustment
- ③ LARK adjustment (inc. CCD output adjustment)
- ④ AF shift adjustment

[Tools required]

1. When adjusting for all adjustment items

ref. Page A31.

2. When inspecting AF accuracy

- ① AF adjustment Z lens (J18266)
- ② AF adjusting tool (J15259)
- ③ Lens holder (J15280)
- ④ AF accuracy measuring chart D40 (J18415)
- ⑤ Chart illuminator for AF (J15264)

3. When adjusting YAW, PITCH

YAW, PITCH tool (J18230)

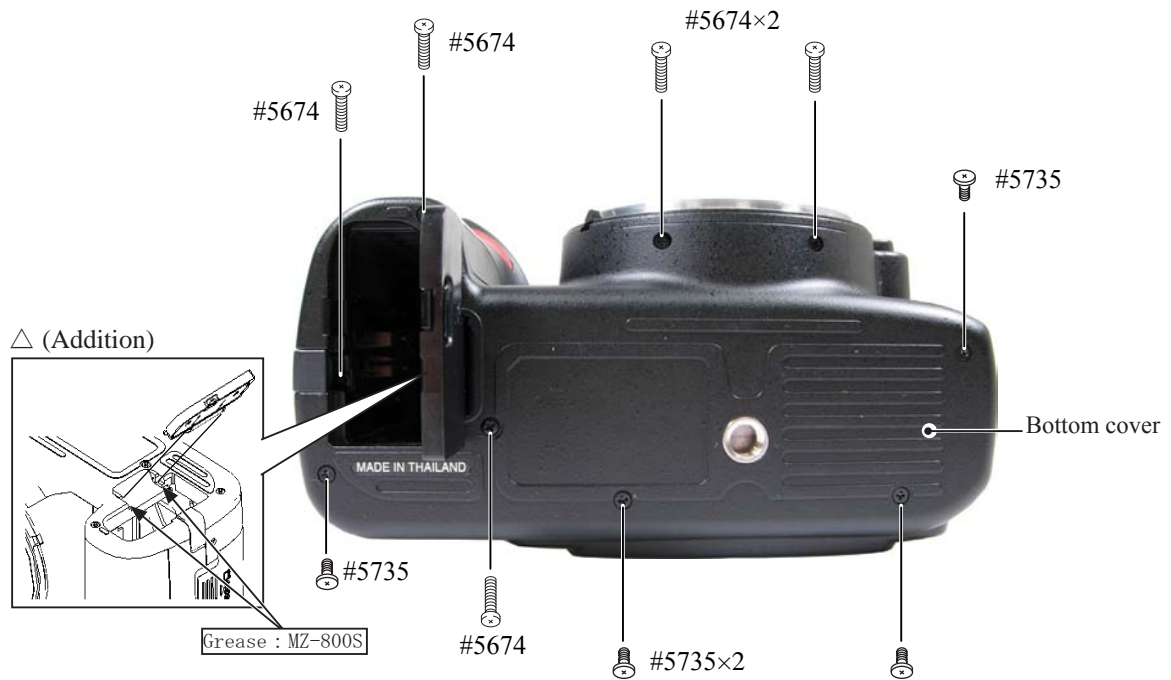
4. When adjusting LARK

The above tool when inspecting AF accuracy

In "AF shift adjustment", the distance from the bayonet reference plane to the imaging area (CCD) is calculated by the actual shot photo, and its error is recorded in EEPROM as compensation amount, and adjusted.

Bottom cover

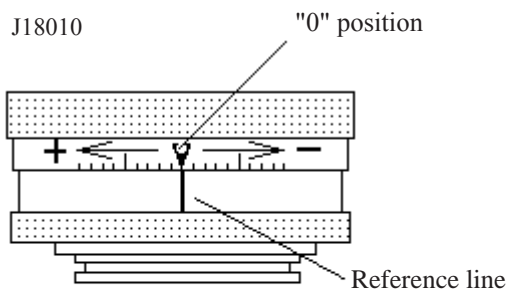
- Mount the bottom cover.
- Fix it with four screws (#5735) and five screws (#5674).



∞ Infinity focus inspection & adjustment

- Replace the finder screen with the infinity focus adjustment screen (J15410), and use the reference lens (J18010) and read the value. In case it is out of standard, increase or decrease washers (#297A, #297B) for adjustments.

Caution: When (J15410) is put in to replace the finder screen, put it with the silver spacers upward, which are attached on both sides.



Standard: $\pm 0.06\text{mm}$ 1 scale = 0.01mm)

#297A	1K602-153	Infinity-focus adjusting washer (T=0.1) 0.10mm
#297B	1K602-154	Infinity-focus adjusting washer (T=0.2) 0.20mm

Necessary adjustments when parts are replaced

1. D40 adjustment software and updates

Adjustments Replacement parts	Writing of EEPROM fixed values	AE CCD positioning adjustment	AE accuracy inspection & adjustment	Aperture accuracy inspection	Battery check volt- age level adjustment	Built-in SB light volume inspection & adjustment	AF accuracy inspection & adjustment
Shutter unit							
* 2 TOGO PCB unit (Firmware MAIN,RISC)	○	* 1 △	○	○	○	○	○
* 2 Relay-PCB (EEPROM)	○	* 1 △	○	○	○	○	○
AF sensor unit							○
Top cover or SB lower case unit						○	
DC/DC PCB unit					○	○	
Metering FPC unit		○	○				
Aperture control PCB unit				○			

* 1. Make an inspection.

* 2. When only TOGO PCB unit is replaced without replacing the relay-PCB, be sure to update the MAIN and RISC firmware before writing the fixed values.

Caution: If the firmware cannot be recognized by MAIN firmware name (AD40XXXXXX.bin), change the firmware name to (A330XXXXXX.bin), and update again. If the RISC firmware name (R330XXXX.BIN) is used, update by following the procedure for forcible updating on Page A49.

When both TOGO PCB and relay-PCB are replaced at the same time, write the fixed values and update the MAIN and RISC firmware. Then, write the fixed values again and make an adjustment.

2. Shooting image adjustment software and Software updates

Adjustments Replacement parts	Writing of fixed values * 2	Sensitivity	Gr/Gb compensation adj. (R/B filter)	Sensitivity ratio	Pixel defect compensation - Black point	Pixel defect compensation - White point	Writing of TFT fixed values	Factory default setting
Shutter unit								
Relay PCB (EEPROM)								
AF sensor unit								
DC/DC PCB unit								
Metering FPC unit								
TOGO PCB unit * 1 (Firmware MAIN,RISC)	○	○	○	○	○	○	○	○
CCD/FPC PCB unit		○	○	○	○	○		
TFT monitor							○	

* 1. When TOGO-PCB unit is replaced, be sure to update the firmware before writing the fixed values.

When both TOGO-PCB unit and relay-PCB are replaced at the same time, write the fixed values before updating, and after updating the MAIN and RISC firmware, write the fixed values again.

* 2. When TOGO PCB is adjusted, the fixed values are written automatically.

Shooting Image Adjustment

1. Summary

When D40 shooting image-related and listed parts on Page A40 are replaced, be sure to make an adjustment by the shooting image adjustment software for D40 (J65094). The details of its function and how to use this software are as follows:

2. Adjustment software function

- ① "Sensitivity" adjustment
- ② Gr/Gb compensation adjustment (R/B filter) / Line crawl adjustment
- ③ "Sensitivity ratio" adjustment
- ④ Pixel defect compensation - black point
- ⑤ Pixel defect compensation - white point
- ⑥ Getting reference values
- ⑦ Factory default setting
- ⑧ Checking of the adjustment value
- ⑨ Reading of RISC version
- ⑩ TFT adjustment

※ When the adjustments from ① to ③ are made, get in advance the reference values of ⑥ by using the reference body, then perform the adjustments.

3. Hardware requirements

OS : Windows2000, WindowsXP
Japanese or English OS
PC : CPU Pentium II or more
Memory 256MB or more
USB1.1 or 2.0
Screen size: 1024×768 pixels or more

4. How to set up

Create any directory in the hard disc (except desk top) of PC, and copy the following files.

- D40IMG.exe Application file
- D40STD.DAT Standard file
- NkdPTP.dll USB-communication application extension file for WinXP
- NkdPTPDi.dll USB-communication application extension file for Win98SE and Win2000
- CCDFLG.DAT Fixed value data for TOGO-PCB adjustment
- CCDINIT.DAT Fixed value data for TOGO-PCB adjustment
- TFTFLG.DAT TFT fixed value data
- TFTINIT.DAT TFT fixed value data

※ Be sure to copy the above file in the same directory.

5. Install of USB driver

When this software is used, the USB driver is necessary. However, this install becomes unnecessary if the D40 camera inspection and adjustment program was installed including the USB driver.

Also, WindowsXP OS has already the USB driver, so this install anew is not necessary, either.

6. Basic usage

- (1) Execute "D40IMG.exe" to start up the main screen. (ref. Fig.1)
- (2) Select ENGLISH / JAPANESE in Language to display any menu. (ref. Fig.2)
- (3) Click the button to start adjustments.
- ※ When the adjustments from ① to ⑤ are made, calculate to get the reference values (⑥) by using the reference body beforehand, then perform the adjustments.
- (4) Follow the instructions on screen.
- (5) To complete the procedure, click "QUIT" button or "X" button at the upper-right corner of the menu.



Fig.1

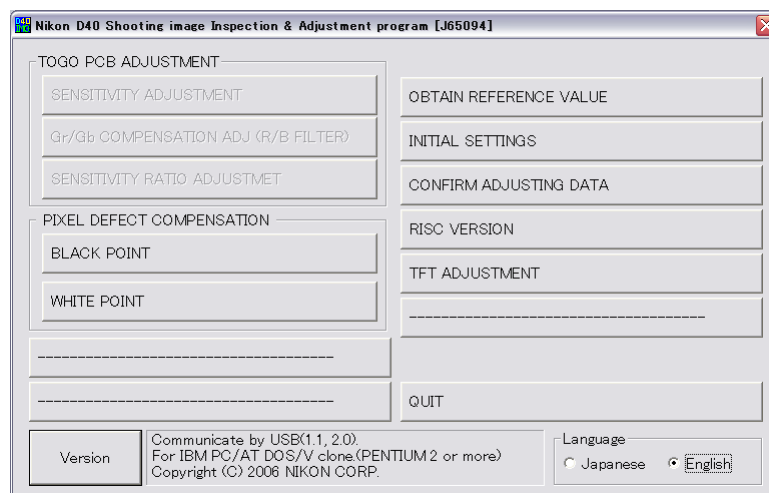


Fig.2

7. Required equipment and conditions

※ AC adapter EH-5, Power connector (EP-5) and USB cable (mini B type) UC-E4 are used for all adjustments so they are not specified in the list.

★ New tool

	Item	Required device	Setting/Remarks
1	Sensitivity adjustment	<ul style="list-style-type: none"> • 5100K color viewer J63070 (ex-model viewer J63049 is also available.) • Luminance meter BM-3000 J63068 • Tool lens (to fix aperture) J61185 • ND filter (ND8×2) 	Luminance LV13 equivalent Aperture F8 52 mm, Use the packaged product; 6-step light reduction
2	Gr/Gb compensation adjustment (R/B filter) / Line crawl adjustment	<ul style="list-style-type: none"> • 5100K color viewer J63070 (ex-model viewer J63049 is also available.) • Luminance meter BM-3000 J63068 • Tool lens (Fixed aperture) J61185 • SP3 (R filter) J63087 • SP1 (B filter) J63085 	Luminance LV13 equivalent Aperture F5.6
3	Sensitivity ratio adjustment	<ul style="list-style-type: none"> • Shutter tester • Tool lens (to fix aperture) J61185 	Luminance LV12 Aperture F5.6; No filter
4	Pixel defect compensation - black point	<ul style="list-style-type: none"> • 5100K color viewer J63070 (ex-model viewer J63049 is also available.) • Luminance meter BM-3000 J63068 • Tool lens (to fix aperture) J61185 	Luminance LV13 equivalent Aperture F5.6; No filter
5	Pixel defect compensation - white point	Body cap or lens cap	Environmental temperature approx. 20 - 25°C
6	Getting of reference values	Same as "Sensitivity adjustment" and "sensitivity ratio adjustment".	
7	Factory default setting	None	
8	Checking of adjustment value	None	
9	Reading of RISC version	None	
10	TFT adjustment	None	

8. Summary

The summary on each adjustment is as follows:

① Sensitivity adjustment

Camera is faced to the color viewer of LV13 equiv. with ND filter (-6 steps) being put between them, and the adjustment is made by changing the amp gain so that G output can fall in the standard range. The gain value is adjusted so that the G output average value (Average of Gr/Gb) in the center (300×300 pixels) can reach the target output level (approx. 960LSB). The actual adjustment of the gain value is made only under the condition of ISO200 and ISO1600, and the medium sensitivity is calculated by the adjustment values of these 2 conditions.

For target output level, G output average of sensitivity reference value (ISO200) is used, which was calculated by the reference body.

② Gr/Gb compensation adjustment (R/B filter) / Line crawl adjustment

Camera is faced to the light-emitting box (color viewer) of LV13 equiv. with SP3 (R filter) or SP1 (B filter) being put between them, and the adjustment is made so that the difference in G output average between B-G line and G-R line, when the whole screen is divided in areas, can fall in the standard range.

③ Sensitivity ratio adjustment

With the shutter tester of LV13, the adjustment is made so that the R/G, B/G output becomes the same as the output ratio of the sensitivity ratio reference value that was calculated by the reference body. The adjustment is made only under the condition of ISO200, and the average value of the center (300 pixels × 300 pixels) is used.

④ Pixel defect compensation - black point

When pixels of which the output level is under specified value with LV13 equiv., are detected, the coordinates of the detected pixels are rewritten as pixel defect compensation data.

⑤ Pixel defect compensation - white point

Shots are taken on the dark surface. In case the pixel output is found to be beyond the standard value, the detected pixel coordinate is additionally written as the pixel defect compensation data.

⑥ Getting of reference values

• Sensitivity reference value calculation

The reference body is faced to the color viewer of LV13 equiv. with the ND filter (-6 step) being put between them. Then, store the G output average value of the center (300 pixels × 300 pixels) is stored in the D40BSD.DAT file as the sensitivity reference value.

• Sensitivity ratio reference value calculation

The reference body is faced to the shutter tester of LV 12 equiv. (without filter). Then, the sensitivity ratio reference value GR and GB is calculated, based on the G/R/B output average of the center (300 pixels × 300 pixels), and they are stored in the D40BSD.DAT file.

It is necessary to calculate the reference values of "Sensitivity" and "Sensitivity ratio" in order to prevent the color temperature fluctuation caused by color viewer's changes over time from affecting the results of the shooting image adjustment. By using the reference body, calculate the reference values once in about every 3 months, when the fluorescent of the color viewer is replaced.

⑦ Factory default setting

This selects and sets the language and video mode at the time of shipping products.

⑧ Checking of adjustment value

The adjustment value is confirmed, functioning as substitute for the traditional "READING AND REWRITING OF EEPROM DATA.".

⑨ Reading of RISC version

The RISC firmware version is displayed.

⑩ TFT adjustment

None

9. Procedure

9-1. TOGO PCB adjustment

- Calculate the "Sensitivity" and "Sensitivity ratio" reference values by using D40 reference body beforehand, then perform the adjustments. (ref. 9-4.)
- For shooting image adjustment, make all items from ① to ③. The adjustments from ① through ③ are all programmed to be executed in serial order. When 1 item is completed, the software automatically goes on to the next adjustment.
- In case adjustments are interrupted by NG, the adjustments can be continued again after NG. As for adjustments that were ended with OK, saving the adjustment values in EEPROM and updating the flash memory are completed.

* **Note: Adjustments are not possible without resetting "Custom setting" of this camera.**

Before the adjustments, record the details of "Custom setting" set by customers if necessary.

Start adjustments

- Provide the power for the camera via AC adapter.
- Reset "Custom setting".
- Set "PTP" mode by Setup menu.
- Set the focus mode to M, exposure mode to M, and the exposure compensation to "0" of the camera.
- Connect the camera and PC via USB cable.
- Set the luminance of the color viewer to LV13 equivalent.
- Set the shutter tester to LV12. (for sensitivity ratio)

① Sensitivity adjustment

- Click "SENSITIVITY ADJUSTMENT" of the main menu on screen.
- Click "Start".
- Setting conditions are indicated.
- Attach the tool lens (Aperture F8) and ND filter (ND 8× 2) to the camera.
- Get the camera closest to the center of the illuminated surface of the color viewer.
- Click "OK".
- The adjustment starts. When it is completed, "OK" is displayed.
- Click "OK".
- Click "Next".

② Gr/Gb compensation adjustment (R/B filter)

- Click "Gr/Gb COMPENSATION ADJ (R/B FILTER)" on the menu.
- Setting conditions are displayed soon.
- Attach the tool lens (Aperture F5.6) and SP3 (R filter) to the camera.
- Get the camera closest to the center of the illuminated surface of the color viewer.
- Click "OK".
- The adjustment starts. When it is completed, the next conditions are displayed.
- Attach the tool lens (Aperture F5.6) and SP3 (B filter) to the camera.
- Get the camera closest to the center of the illuminated surface of the color viewer.
- Click "OK".
- The adjustment starts. When it is completed, the next conditions are displayed.

[• Attach the tool lens (Aperture F5.6) and SP1 (B filter) to the camera.]

- Get the camera closest to the center of the illuminated surface of the color viewer.
- Click "OK".
- The adjustment starts. When it is completed, the next conditions are displayed.
- Attach the tool lens (Aperture F5.6) and SP3 (R filter) to the camera.
- Click "OK".
- The adjustment starts. When it is completed, "OK" is displayed.
- Click "OK".
- Click "Next".

③ Sensitivity ratio adjustment

- Click "Start".
- Setting conditions are indicated.
- Attach the tool lens (Aperture F5.6) to the camera (without filter).
- Get the camera closest to the center of the illuminated surface of the shutter tester (LV12).
- Click "OK".
- The adjustment starts. When it is completed, "OK" is displayed.
- Click "OK".
- Click "Next".

9-2. Pixel defect compensation

④ Compensation - black point

- Set the color viewer luminance to LV13 equiv.
- Provide the power for the camera via AC adapter.
- Reset "Custom setting".
- Set "PTP" mode by Setup menu.
- Set the focus mode to M, exposure mode to M, and the exposure compensation to "0" of the camera.
- Connect the camera and PC via USB cable.
- Click "Start".
- Setting conditions are indicated.
- Attach the tool lens (Aperture F5.6) to the camera (without filter).
- Get the camera closest to the center of the illuminated surface of the color viewer.
- Click "OK".
- When the adjustment starts, pixel defects are detected, displaying the number of pixels and addresses.
- When it is completed, "OK" is displayed.
- Click "OK".

* Note: In some cases, NG occurs due to dusts on the CCD.

Be sure to clean the CCD surface before adjustments.

9-3.

⑤ Compensation - white point

- Check the environmental temperature (approx. 20-25°C).
- Click "Start".
- Setting conditions are indicated.
- Cap the camera with the body cap or lens cap to shield light from the mount.
- Click "OK".
- When the adjustment starts, pixel defects are detected, displaying the number of pixels and addresses.
- When it is completed, "OK" is displayed.
- Click "OK".
- Click "End".

9-4.

⑥ Getting of reference values

- Select "OBTAIN REFERENCE VALUE." of the menu on screen.
- Click "Start".
- Click "Start" again.
- The message of setting conditions is displayed.
- Click "OK".
- Attach the tool lens (Aperture F8) and ND filter (ND 8× 2) to the camera.
- Get the camera closest to the center of the illuminated surface of the color viewer.
- The adjustment starts, and getting "Sensitivity" reference value is completed.
- Click "OK".
- Click "Next".
- Click "Start" of "OBTAIN RATIO REFERENCE VALUES".
- Attach the tool lens (Aperture F5.6). (Remove the filter).
- Get the camera closest to the center of the illuminated surface of the shutter tester (LV12).
- The adjustment starts. When it is completed, the sensitivity and sensitivity ratio reference values are stored in the standard setting file (D40BSD.DAT).
- After this procedure, when the shooting image adjustment is made, the sensitivity and sensitivity ratio that were calculated this time are used.

※ Calculate the sensitivity and sensitivity ratio reference values once in about every 3 months, and when the fluorescent of the color viewer is replaced.

9-5. TFT adjustment

Writing of TFT fixed values

- Click "REWRITING THE TFT FIXED VALUE".
- The message "Will you rewrite the CAMERA?" appears.
- Click "Yes".
- Writing is completed.
- Click "OK".

Flicker adjustment

- Usually default value is set and adjustment is not necessary.
- If flicker is recognized by visual check, adjust by the slider so that no flicker is visible.
- Remove the USB cable from the camera, then remove the AC adapter without turning the camera OFF.

Hue adjustment

- Usually default value is set and adjustment is not necessary.
- If some problem is found with hue by visual check, adjust and correct it by the slider.
- Remove the USB cable from the camera, then remove the AC adapter without turning the camera OFF.

Brightness adjustment

- Usually default value is set and adjustment is not necessary.
- If some problem is found with brightness by visual check, adjust and correct it by the slider.
- Remove the USB cable from the camera, then remove the AC adapter without turning the camera OFF.

9-6. Reading of RISC version

- Click "RISC VERSION" of the menu on screen.
- RISC version is displayed.

9-7. Procedure for upgrading RISC firmware:

- After preparing the SD card, copy the latest version (BD40XXXX. BIN) into the root directory.
- Insert the SD card, and select "FIRMWARE VERSION" from the SETUP menu.
- Follow the instructions on screen for version upgrading. It takes approx. 3-4 minutes.
- Check the version of firmware by "RISC VERSION" of the image adjustment software.

Caution:

In case incorrect files are included in the SD card, the details for updating are not displayed even after selecting "FIRMWARE VERSION" from the SETUP menu.

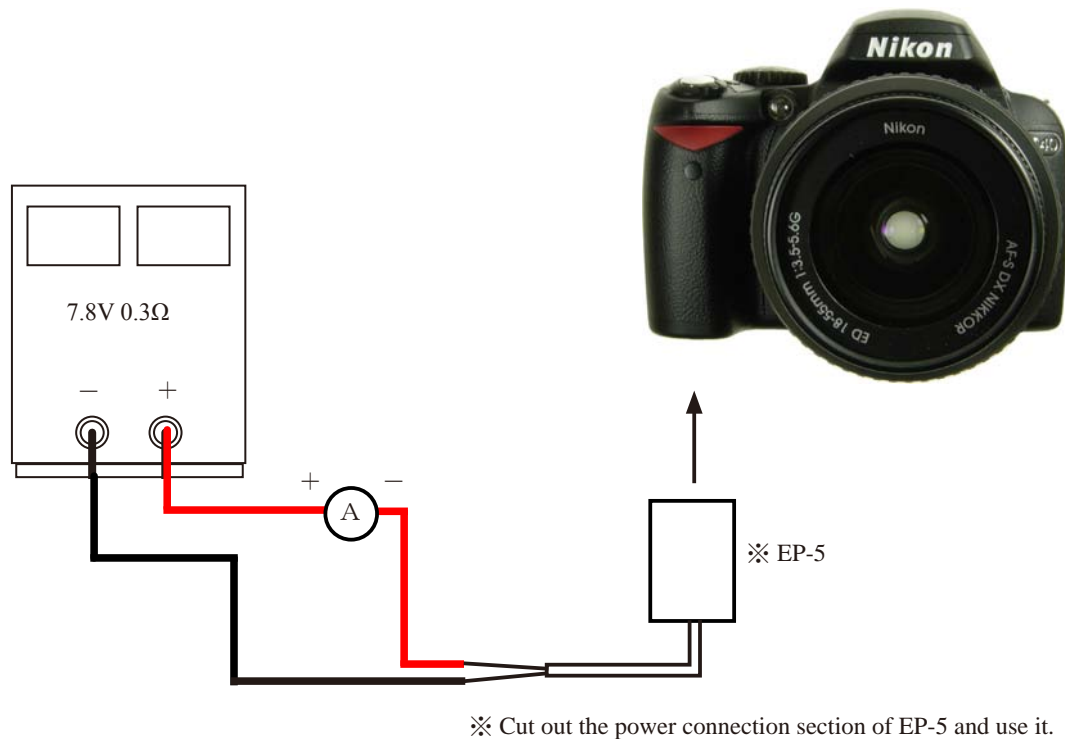
Procedure for upgrading RISC firmware, when TOGO PCB is replaced:

- After preparing the CF card, copy the latest version (R330XXXX. BIN) into the root directory.
- Insert the SD card, and while pressing "Playback zoom" button and "OK" button, turn the camera SW to ON.
- The firmware upgrading starts forcibly.
- When the memory card access lamp stops to blink, turn the camera SW to OFF and remove the card.

Caution: Unless power source is provided again, the camera cannot be turned ON.

< Measurement of Consumption current value >

When this camera is used for measuring the consumption current value, connect the power connector (EP-5) and install wiring as follows for the measurement.



《Inspection standards》

Test item	Standard	Test condition
Main SW • OFF All operational buttons are NOT pushed.	200 μ A or less	ref. above.
Main SW • ON (Half-release timer OFF)	200 μ A or less	AF-S DX ED 18-55/3.5-5.6G、 EV12
Main SW • ON (Half-release timer ON)	200 μ A or less \triangle (Revision) 200mA or less	
Main SW • ON (TFT ON)	1 A or less	

Caution

* When the consumption current value is measured, backup battery must be fully charged.



Inspection standards

Items	Judgment standard	Remarks
External view Step (height difference)	Between top cover and apron: 0.2 mm or less Other parts: 0.3 mm or less; Inside elements must not be seen. Moving parts: 0.5 mm or less	Visual check Digital micrometer
Clearance	from Top cover to Apron; to rear cover: 0.2 mm or less from Bottom cover to Apron; to rear cover: 0.2 mm or less When SB is housed, from SB upper case to Top cover; to Apron: 0.5 mm or less Other parts: 0.3 mm or less; Inside elements must not be seen. Moving parts: 0.5 mm or less	
Size / Force Shutter release button	Protrusion: 1.05 ± 0.2 mm Halfway pressing force: 100 ± 50 g Halfway pressing stroke: 0.5 ± 0.2 mm Releasing force: 260 ± 70 g Releasing stroke: 0.7 ± 0.25 mm Full stroke: 0.6 mm or more Difference btwn Half-releasing and Full pressing force: 51 g or more	Digital micrometer Tension gauge
Aperture lever	Height: $3.4 + \begin{smallmatrix} +0.20 \\ -0.10 \end{smallmatrix}$ mm	3.4 height gauge
Main mirror	45° angle: Up-down $\pm 10'$ Right-left $\pm 30'$ Distortion: 6' or less Clearance for up-mirror in mirror box: None	Collimator Main mirror tool Visual check Feeling in hand
Sub-mirror	47.75° angle: Up-down Collimator measurement value: $-5' \begin{smallmatrix} +20' \\ -45' \end{smallmatrix}$ Distortion: 8' or less	Sub-mirror tool
Finder ∞ Infinity focus	$\pm 100\mu\text{m}$	Collimator ∞ focus lens

Items	Judgment standard	Remarks
AF accuracy Yaw	Center: 0 ± 4 mrad Others: 0 ± 12 mrad	PC Special tool Brightness box
Pitch	Center: 0 ± 5 mrad Others: 0 ± 10 mrad	
Def amount	Difference btwn vertically and horizontally (center): 45 μ m or less	
AF-assist illuminator Lighting level	Switchable from OFF to ON with EV5.2 - 6.2	Brightness box AF-S 18-55/3.5-5.6G
AE Exposure on image Accuracy	1/4000 or higher speed: ± 0.65 EV (excl. AMP) From lower-than 1/4000 to 1/2000 or higher speed: ± 0.65 EV Lower than 1/2000 speed: ± 0.5 EV	AE-A mode, each metering mode, AE50/1.4D, F5.6, ∞ , A light source, ISO200, Shooting on illuminated surface of bright ness box Note that AMP: EV3 \sim 10 SPOT: EV2 \sim 20
Dispersion	1/2000 or higer speed: 0.6EV or less Lower than 1/2000 speed: 0.6EV or less Difference in Metering mode: 0.3EV or less	
Shutter accuracy Speed accuracy	Higher than 1/2000 speed: ± 0.55 EV 1/2000: ± 0.35 EV (1/2000) \sim 30 : ± 0.25 EV	
Dispersion	1/4000 - (1/2000): 0.4EV or less 1/2000 - (1/1000): 0.3EV or less 1/1000 - 30: 0.25EV or less	Shutter speed tester
Shutter curtain speed	Both front and rear curtains (16.6mm or less): approx. 3.8 ms or less	
Shutter curtain bound	Black/white bound (within screen frame): None	
Synchronization	Time lag: -0.05-0.5 ms	

Items	Judgment standard	Remarks						
Viewfinder In-finder LCD position	Tilt from finder screen: 1° or less	Visual check						
Finder field frame	Tilt: (Right-left tilt from the lower part of finder field frame): 90' ± 0.5° or less Relative angle to image sensor: 30' or less	Shoot the finder field frame with the 0.2-mm-or-less tilt of optical axis from the viewfinder eyepiece optical axis, and measure the angle.						
Field of viewfinder (frame coverage)	In height and width: 95 ± 3 %	AF50/1.4D, F5.6						
Parallax (Difference in position from CCD center)	Up-down: 0.5 mm or less Right-left: 0.5 mm or less No vignetting	Measure a difference in the center btwn the marked finder field and actual shot object.						
Eye point	- 1 m ⁻¹ equivalent position [1 click from Minus-end]	Eye point tool Vernier caliper						
Battery life EN-EL9	<p>Professional mode</p> <p>Room temperature: 2500 frames or more 0°C : 1900 frames or more</p> <ul style="list-style-type: none"> Setting ISO200, Exposure mode: M, 1/250 sec., F16, AF-C, operation mode: C, Illuminated surface: LV12, Image quality: BASIC, Image size: M, White balance: A, Halfway press → Card format → Repeat the below "Operation" → Remove the card when the no. of exposures remaining becomes "0" → Card format →... Lens: AF-S 18-55/3.5-5.6G (AF-S 18-55/3.5-5.6G II when this becomes available.) Operation: Halfway press for 3 sec. → AF-scan reciprocating motion 3 times → Continuous releases 6 times → TFT playback for 5 sec. → Half-release timer OFF waiting for 6 sec. <p>General mode</p> <p>Room temperature: 500 frames or more 0°C : 400 frames or more</p> <ul style="list-style-type: none"> Setting ISO200, Exposure mode: M, 1/250 sec., F16, AF-C, operation mode: S, Illuminated surface: LV12, Image quality: NORM, Image size: L, White balance: A, Halfway press → Card format → Repeat the below "Operation" → Remove the card when the no. of exposures remaining becomes "0" → Card format →... Lens: AF-S 18-55/3.5-5.6G (AF-S 18-55/3.5-5.6G II when this becomes available.) Operation: Repeat the following the odd-numbered shots and even-numbered shots until the number of exposures remaining becomes "0". Switch power OFF for 1 min. each time 10 frames are shot. <table border="1"> <thead> <tr> <th>Shots</th><th>Odd-numbered shots</th><th>Even-numbered shots</th></tr> </thead> <tbody> <tr> <td>Repeat operation MENU ① - ⑤</td><td> ① Halfway press 5 sec. ② AF scan reciprocating motion once ③ Release... Built-in SB full flash ④ LCD monitor playback 4 sec. ⑤ Half-release timer OFF waiting 6 sec. ※ Activate the flash of AF-assist illuminator. </td><td> ① Halfway press 5 sec. ② AF scan reciprocating motion once ③ Release... Built-in SB full flash ④ LCD monitor playback 4 sec. ⑤ Half-release timer OFF waiting 6 sec. ※ Do NOT activate the flash of AF-assist illuminator. </td></tr> </tbody> </table>	Shots	Odd-numbered shots	Even-numbered shots	Repeat operation MENU ① - ⑤	① Halfway press 5 sec. ② AF scan reciprocating motion once ③ Release... Built-in SB full flash ④ LCD monitor playback 4 sec. ⑤ Half-release timer OFF waiting 6 sec. ※ Activate the flash of AF-assist illuminator.	① Halfway press 5 sec. ② AF scan reciprocating motion once ③ Release... Built-in SB full flash ④ LCD monitor playback 4 sec. ⑤ Half-release timer OFF waiting 6 sec. ※ Do NOT activate the flash of AF-assist illuminator.	
Shots	Odd-numbered shots	Even-numbered shots						
Repeat operation MENU ① - ⑤	① Halfway press 5 sec. ② AF scan reciprocating motion once ③ Release... Built-in SB full flash ④ LCD monitor playback 4 sec. ⑤ Half-release timer OFF waiting 6 sec. ※ Activate the flash of AF-assist illuminator.	① Halfway press 5 sec. ② AF scan reciprocating motion once ③ Release... Built-in SB full flash ④ LCD monitor playback 4 sec. ⑤ Half-release timer OFF waiting 6 sec. ※ Do NOT activate the flash of AF-assist illuminator.						

Items	Judgment standard	Remarks
Standby / consumed current	Main SW / OFF: 200μA or less (when inner battery is fully charged) Main SW / ON (Half-release timer: OFF): 200μA or less (when inner battery is fully charged) Main SW / ON (Half-release timer: ON): 200μA or less (when no operations made) Main SW / ON (TFT monitor ON): 1A or less	Power source: 7.8V Luminance: EV12 Lens: 18-55/3.5-5.6G Oscilloscope: measured by + current probe
Operation time	Lens scan 18-55/3.5-5.6G: 1250 ms or less Release without memory card (18-55/3.5-5.6G): 195ms or less (between mirror up and down)	Power source: 7.8V+0.3Ω Luminance: EV12 Oscilloscope: measured by + current probe
Consumption current accumulated	Lens scan 18-55/3.5-5.6G: 630 mAs or less Release without memory card (18-55/3.5-5.6G): 245mAs or less (between mirror up and down)	
Clock accuracy (20±5°C)	Difference par month: ±90 seconds	Wave clock
BC level	Level 5: 5 lights up Charge remaining: 70 ~ 100% Level 4: 4 lights up Charge remaining: 50 ~ 69% Level 3: 3 lights up Charge remaining: 35 ~ 49% Level 2: 2 lights up Charge remaining: 20 ~ 34% Level 1: 1 light up Charge remaining: 1 ~ 19% Level 0: 1 light blinking Charge remaining: 0%	Check the level in the LCD control panel on top of camera or TFT battery information Communication-capable battery tool
Bulb battery life	1 hour and 40 minutes or more	When battery is fully charged Clock

工 具 ・ TOOLS

★ : 新規設定工具 ・ NEW TOOL

工具番号 Tool No.	名 称 Name of tool	備 考 Others
J15428 	AE CCD 位置出し工具 AE CCD positioning tool	FOR D80
J15410 	無限合致調整用スクリーン Infinity focus adjustment screen	FOR D70, D70s, D50
J18362 	反射ミラー Reflection mirror	FOR D70, D70s, D50
★ J18416 	D 4 0 調整用 F D I B M 3 . 5 Adj. fd for D40 (IBM 3.5)	
★ J65094 	D 4 0 撮像調整ソフト D40 IMAGE SENSOR ADJ. SOFT (J/E)	
J18230 	Y A W、P I T C H 工具 Yaw, Pitch adjustment tool	FOR F5, F100, F90, F90X, D70, D70s, D50, D200, D80 D100, D2series △ (追加) △ (Addition)
J15259 	A F 調整工具台 AF adjusting tool	
J15280 	Z レンズ用支持ホルダー Lens holder	
J15264 	高周波タイプ蛍光灯器具 Illumination box for AF adjustment	
J18266 	A F 調整用 Z レンズ (1 m 用) Z adjustment lens (For 1m)	FOR F5, F100, D70, D70s, D50, D200 D100, D80, D2series △ (追加) △ (Addition)
J15409 	チャートボード Chart board	FOR D2H, D2X, D2Xs D2series △ (訂正) △ (Revision)
★ J18415 	A F 精度測定用チャート D 4 0 AF adjusting chart	FOR D100, D70, D70s, D50, D200 D80, D2series △ (追加) △ (Addition) ※ TI-06178 参照 ref.TIE-06178

★：新規設定工具・NEW TOOL

工具番号 Tool No.	名 称 Name of tool	備 考 Others
J19110 	小型バック出しコリメータ Back focus collimator	
★ J61218 	サブミラー位置だし工具 (D 4 0) Sub mirror inspection tool (D40)	
J18037-2 	オプチカルパラレル Optical parallel	
J18004 	絞りレバー高さ点検工具 Aperture lever positioning gauge	
J19004-1 	インジケータ及びスタンド (ボディバック台、ゲージ) Dial indicator and Stand	
J18001-1 	ボディバック出し工具 Body back focus gauge	
J19001 	無限合致コリメーター F=600mm Collimator F=600mm	
J18010 	無限大合致基準レンズ 50/1.8 Infinity Standeard Lens 50/1.8	払底品
J19123 	シャッター試験機 EF-1 (CE) Shutter Tester EF-1 (CE)	共立電機製 KYORITSU ELECTRIC EF -8000 usable

★ : 新規設定工具・NEW TOOL

工具番号 Tool No.	名 称 Name of tool	備 考 Others
J18267 	AF 50 / 1.4 D Lens AF50/1.4D	
J61185 	撮像関係調整用レンズ D1 Standard lens	FOR D1, D2H, D70, D70s, D50 D200
J18191 	ND フィルター 8 X ND filter 8X	2 枚使用 It uses by two pieces FOR D2H, D70, D70s, D50. D200
J63070 	カラービューア Color Viewer	
J63068 	輝度計 (BM-3000) Luminance Meter BM-3000	
J63085 	フィルター SP1 (75X75MM) Filter SP1 (75X75MM)	FOR D2H, D70, D70s, D50. D200
J63087 	フィルター SP3 (75X75MM) Filter SP3 (75X75MM)	FOR D2H, D70, D70s, D50. D200
△ (追加) △ (Addition) ★ J61219 	D 4 0 電池工具 D40 Battery tool	
★ J61223 	ライティングルーペ LIGHTING LOUPE	FOR D-SLR
★ J61224 	D 4 0 撮像用基準ボディ D40 REF BODY	

工具番号 Tool No.	名 称 Name of tool	備 考 Others
OS-30MF 	ドライサーフ OS-30MF DRY SURF OS-30MF (OIL BARRIER)	
LEN317A 	グリース LEN317A Grease LEN317A	
EDB0011 	ネジ ロック (赤) 1401C Screw lock 1401C	
C-8008B 	セメダイン 8008 (黒) Gemedain 8008 (BLACK)	
MZ-800S 	ドライサーフ MZ-800S DRY SURF MZ-800S	
	アロンアルファ Crazy glue	汎用品 RJ is Not available
	フラッシュメーター Flash Meter	汎用品 RJ is Not available
	デジタルマルチメータ Digital meter	汎用品 RJ is Not available
	A Cアダプター EH-5 AC adapter EH-5	製品転用 RJ is Not available
	U S Bケーブル UC-E 4 USB cable UC-E4	製品転用 RJ is Not available
	パーソナルコンピュータ Personal computer	汎用品 RJ is Not available
	安定化電源 (10 V 5 A) Power supply (10V 5A)	汎用品 RJ is Not available
	ヘクスキー (φ 1.5mm) HEX. KEY WRENCH (φ 1.5mm)	汎用品 RJ is Not available
	A F 2 8 / 2 . 8 D Lens AF28/2.8D	製品転用 RJ is Not available
	パワーコネクタ EP-5 AC ADAPTER CONNECTORS EP-5	製品転用 RJ is Not available